

The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

**CRANIOFACIAL VARIATION, INTEGRATION, AND EVOLUTIONARY
DIVERSIFICATION IN BABOONS**

Eileen Catherine Off (OFFEIL001)

Thesis Presented for the Degree of

DOCTOR OF PHILOSOPHY

In the Department of Archaeology

UNIVERSITY OF CAPE TOWN, SOUTH AFRICA

June 2009

DECLARATION

I, Eileen C. Off, hereby declare that the work on which this dissertation is based is my original work (excepts where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

I authorize the university to reproduce for the purpose of research either the whole or any portion of the contents in any manner whatsoever.

Signature:

Date:

University of Cape Town

ABSTRACT

CRANIOFACIAL VARIATION, INTEGRATION, AND EVOLUTIONARY DIVERSIFICATION IN BABOONS

By

EILEEN C. OFF

Advisor: Dr. Rebecca Rogers Ackermann

Speciation and form have long been integral topics in the field of biological anthropology. Baboons (Papionins, Cercopithecinae) are among the most studied of all primates and recently there have been investigations into their genetic and phylogenetic position. The baboons are especially interesting as there is still a debate as to whether all the major “forms” fall under one species, and therefore should be referred to as different subspecies, or whether these forms should all be identified separately at the specific level. There is also a debate as to where *Papio kindae* belongs in the overall *Papio* phylogeny, and moreover whether this baboon - born white at birth and typically lumped with *P. cynocephalus* - is itself a distinct species. Quantification of morphological variation in *Papio* will provide a better understanding of variation within baboons, in order to understand the relationship between variation and integration, as well as to understand

the underlying causes of diversification in the genus. This dissertation aims to increase our understanding of *Papio* by: 1) examining variation within and between baboon species; 2) investigating morphological integration in the cranium, and; 3) determining what evolutionary processes produce diversification among baboon crania.

Twenty-five three-dimensional cranial landmarks on six-hundred and sixty four baboon crania from seven species were digitized. Forty-seven linear distances, chosen to cover the skull with minimal redundancy, were calculated from these coordinate data. These data were subjected to a suite of quantitative analyses including principal component analyses, correlation/covariance matrix comparisons, and the calculation of Mahalanobis distances (D^2). Unweighted pair group method with arithmetic mean (UPGMA) and minimum spanning trees (MST) were calculated to visualize the relative relationships among the taxa.

Results of within and between species variation analyses reveal a separation of *P. ursinus* and *P. kindae* from the rest of *Papio*. Both *P. ursinus* and *P. kindae* show the most variability within each species. While principal component analysis shows a separation of *P. ursinus* from the rest of *Papio*, it also separates *P. ursinus* into four possible groups. Results indicate that these groups do not separate clearly by sex or geography as expected. Matrix correlations also indicate a large separation between *P. ursinus* and the rest of *Papio*. The presence of such variability in *P. ursinus* is possibly due to the fact that genetically this species is the basal species in the lineage and that *P. ursinus* inhabits a wide variety of habitats. Differences in morphology, primarily within the masticatory region, indicate that ecology, and diet, may be the reason for such variability.

Principal component analyses clearly distinguish *P. kindae* from the rest of *Papio* based on size. Principal component analysis, matrix correlations, and Mahalanobis D^2 distances also clearly separate *P. kindae* from the rest of *Papio*. Upon examining the role of genetic drift versus natural selection in *Papio*, it was determined that smaller body size has likely been selected for in *P. kindae*.

Matrix comparisons are made to quantify overall morphological pattern similarity between species. All matrix correlations were highly significant. While analyses separate *P. ursinus* and *P. kindae* from the rest of *Papio*, results indicate a high level of similarity between *P. anubis* and *P. cynocephalus*, indicating that these species (co)vary similarly. Discriminate function analysis assigned *P. ursinus* and *P. kindae* correctly 99.5% of the time. *P. anubis* and *P. cynocephalus* were assigned correctly 88.5% of the time, while the remainder of the time they were assigned to the other species (*P. anubis* was assigned to *P. cynocephalus* and vice versa). Given the geographic proximity of these species, and the presence of known hybrid zones, these incorrect assignments may not be surprising.

Analyses of morphological integration indicate that *P. cynocephalus*, *P. hamadryas*, and *P. papio* show high levels of morphological integration in the cranium, as indicated by strong correlation between their covariance patterns and the total integration matrix. Cranial integration for *Papio* and *Theropithecus* can be summarized as follows: a high degree of total integration throughout the entire cranium, with primarily contributions by the nasal and oral units. Overall, the nasal region appears to be the most highly integrated and the orbital region the least integrated. After this small differences emerge between the species. *P. papio* is the most highly integrated overall, while

Theropithecus is the least integrated in terms of total morphological integration. It is surprising, however, that *P. ursinus* and *P. anubis* do not show high patterns of total morphological integration.

Examination of within and between group patterns of variation in *Papio* and *Theropithecus* suggest that natural selection has acted to produce diversity in this lineage; divergence within *Papio* and *Theropithecus* is unlikely to be due to genetic drift alone. However, these analyses also reveal that it is *P. kindae* that is driving this pattern, and when this taxon is removed from the analysis of *Papio* overall diversity is consistent with genetic drift. A more broad scale inquiry into evolutionary processes might ultimately show that selection is related to size, which may in turn be related to differences in diet and/or foraging strategies.

This manuscript has been read and accepted for the Faculty of Science, Department of
Archaeology in satisfaction of the dissertation requirement for the degree of
Doctor of Philosophy

Date

Head of Faculty of Science:

Date

Head of Department: Professor Judy Sealy

Head Supervisor: Rebecca Rogers Ackermann, PhD

THE UNIVERSITY OF CAPE TOWN, SOUTH AFRICA

For Gregor, the turnip picker

University of Cape Town

ACKNOWLEDGEMENTS

Africa is a place that people fall for hard; and a place that sometimes falls on them hard. There are so many people to thank. Dr. Jim Calcagno at Loyola University can take most of the credit for inspiring me to pursue a career in primatology - his enthusiasm for the field quickly inspired me to pursue a career in physical anthropology. I can thank Drs. Lynne Isbell and Truman Young for my first opportunity to travel to Africa. Dr. Isbell truly made me aware that I could do all the things I wanted to do. I can only be so very grateful to Bernard, who helped my search for bushbabies while everyone was heading off to bed.

As for my voyage to Cape Town, I have Drs. Gary Schwartz and Rebecca Rogers Ackermann to thank. I thank Gary for facilitating the connection between Becky and me. More importantly, I thank Becky for taking on a student with a background in primate behavioral ecology and I thank her for her advice and helpful criticism throughout this project. I also thank her for having patience and for opening her home up to me. I thank all the Professors at the University of Cape Town especially, Professors Judy Sealy and Julia Lee-Thorp for their support and aid as well as John Lanham and Lynne cable for their often needed technical assistance. Research was funded by University of Cape Town Research funds, National Research Foundation, South Africa, as well as the Paleoanthropological Society (PAST).

This project could not have succeeded without the help and support of many curators, staff, and assistants of various museums: Bill Stanly (Field Museum of Natural History, Chicago); Teresa Kearney (Northern Flagship Institution, Transvaal Museum,

Pretoria); Denise Hammerton (Iziko Museums of Cape Town); Ms. Pather (The University of the Witwatersrand, School of Anatomical Sciences, Johannesburg); Mr. Ogeto Mwebi (Kenya National Museums); Paula Jenkins, Daphne Hills, and Louise Tomsett (British Museum of Natural History, London); Lyman Jellema (Cleveland Natural History Museum); Linda Gordon (National Museum of Natural History, Washington, D.C.); and Wim Van Neer (Musee Royal de l’Afrique Centrale, Tervuren, Belgium). I have also benefited from conversations with Professor Colin Groves of the Australian National University and appreciate his advice. Professor Bala Hosmane, Joe Parham, Dr. Shawn Mason, Gene Shlikhutka, and Nate Dieckman helped when it came to statistical analyses and formatting.

Many thanks to those who provided their hospitality and a couch for me during my visit to London: Drs. Charles Lockwood and Kris (Fire) Korakovic. I am deeply indebted to Fire, Daniel Rayner, Tara Peburn, and Karen Baab for their support and advice when nothing was going right in London. Obviously I cannot forget my dearest friends Nicole Hajdu and Julie Harr who provided support from far away.

I thank my family, Gregory, Mary Alice, and my grandmother for calling on the holidays, sending packages, and providing support. And finally, there is my precious little cat Peeche whom I adopted in Cape Town and kept me warm on those cold, rainy nights.

TABLE OF CONTENTS

TITLE PAGE	i
DECLARATION PAGE	ii
ABSTRACT	iii
APPROVAL PAGE	vi
DEDICATION	vii
ACKNOWLEDGEMENTS	viii
TABLE OF CONTENTS	x
TABLES	xiii
FIGURES	xiv
CHAPTER 1: INTRODUCTION	1
WHY STUDY VARIATION?	1
BABOON SYSTEMATICS AND TAXONOMY	2
BABOON PHYLOGENETICS	5
BABOON MORPHOLOGICAL VARIATION	6
MORPHOLOGICAL INTEGRATION IN PRIMATE CRANIA	11
CRANIAL DIVERSIFICATION IN PRIMATES	15
PROJECT GOAL	18
CHAPTER 2: SPECIMENS, LANDMARKS, AND DATA COLLECTION	19
SPECIMENS	19
LANDMARKS	23
DATA COLLECTION	23
CHAPTER 3: MORPHOMETRIC AND STATISTICAL METHODS	28
PRINCIPAL COMPONENT ANALYSIS	28
CANONICAL VARIATES ANALYSIS	31

MAHALANOBIS (D^2) ANALYSIS	32
MATRIX CREATION AND BENDING	34
MORPHOLOGICAL INTEGRATION	35
CORRELATION AND COVARIANCE PATTERNS	36
MATRIX REPEATIBILITY AND ADJUSTED MATRIX	
CORRELATIONS	38
ALLOMETRY	39
EVOLUTIONARY DIVERSIFICATION	40
CHAPTER 4: MORPHOMETRIC RESULTS OF CRANIAL	
MORPHOLOGY	43
SEXUAL DIMORPHISM	43
PRECISION AND MEASUREMENT ERROR/ REPEATABILITY	44
PRINCIPAL COMPONENT ANALYSIS	47
CANONICAL VARIATES ANALYSIS	55
MAHALANOBIS DISTANCES (D^2)	61
VARIATION BETWEEN INDIVIDUALS WITHIN SPECIES	67
RESULTS FOR <i>PAPIO ANUBIS</i>	67
RESULTS FOR <i>PAPIO CYNOCEPHALUS</i>	69
RESULTS FOR <i>PAPIO URSINUS</i>	70
MATRICES	76
CORRELATION AND COVARIANCE PATTERNS BETWEEN SPECIES	76
CORRELATION AND COVARIANCE PATTERNS BETWEEN FEMALES AND MALES	79
PATTERNS OF ALLOMETRY	83
MORPHOLOGICAL INTEGRATION	86
EVOLUTIONARY DIVERSIFICATION: DETERMINING THE ROLE OF GENETIC DRIFT	88

CHAPTER 5: DISCUSSION AND CONCLUSIONS	93
BETWEEN SPECIES VARIATION	94
WITHIN SPECIES VARIATION	97
MORPHOLOGICAL INTEGRATION	99
EVOLUTIONARY DIVERSIFICATION	100
<i>P. URSINUS</i> AND THE <i>P. KINDAE</i> QUESTION	103
FUTURE RESEARCH	104
BIBLIOGRAPHY	106
APPENDIX: DATA AND SUMMARY STATISTICS	125

University of Cape Town

LIST OF TABLES

TABLE 1. SAMPLE SIZES BY SPECIES AND SEX	20
TABLE 2. LANDMARK DEFINITIONS USED IN THE PROJECT	24
TABLE 3. LINEAR SKULL MEASUREMENTS AND THEIR MAJOR FUNCTIONAL GROUPS AND CRANIAL REGIONS	26
TABLE 4. MEASUREMENT REPEATABILITY	46
TABLE 5. SUMMARY OF PCA AND ANOVA RESULTS	49
TABLE 6. RESULTS OF T-TESTS FOR PAIRWISE COMPARISONS AND BONFERRONI ADJUSTED P-VALUES	50
TABLE 7. SUMMARY OF CVA AND ANOVA RESULTS	56
TABLE 8. CROSS-VALIDATION RESULTS FOR CVA	56
TABLE 9. RESULTS OF PAIRWISE T-TESTS FOR CV'S 1-4 AND BONFERRONI ADJUSTED P-VALUES	57
TABLE 10. MAHALANOBIS DISTANCES	62
TABLE 11. MINIMUM SPANNING TREE	63
TABLE 12. UPGMA CLUSTER ANALYSIS	64
TABLE 13. <i>P. ANUBIS</i> – FIRST 3 PRINCIPLE COMPONENTS	68
TABLE 14. <i>P. CYNOCEPHALUS</i> – FIRST 4 PRINCIPLE COMPONENTS	69
TABLE 15. <i>P. URSINUS</i> – FIRST 3 PRINCIPLE COMPONENTS	70
TABLE 16. <i>P. URSINUS</i> – AGGLOMERATION COEFFICIENTS FOR THE LAST SIX CLUSTER COMBINATIONS	71
TABLE 17. <i>P. URSINUS</i> – ROTATED LOADING MATRIX	75
TABLE 18. MATRIX CORRELATION AND RANDOM SKEWERS VECTOR CORRELATION BETWEEN SPECIES	78
TABLE 19. MATRIX CORRELATION AND RANDOM SKEWERS VECTOR CORRELATION BETWEEN FEMALES OF EACH SPECIES	81
TABLE 20. MATRIX CORRELATION AND RANDOM SKEWERS VECTOR CORRELATION BETWEEN MALES OF EACH SPECIES	82
TABLE 21. ALLOMETRY VECTORS OF WITHIN- GROUP COVARIANCE	84
TABLE 22. ANGLES BETWEEN VECTORS	85
TABLE 23. MORPHOLOGICAL INTEGRATION FOR EACH SPECIES	87
TABLE 24. GROUPINGS FOR THE TEST OF SELECTION VERSUS GENETIC DRIFT	89
TABLE 25. RESULTS OF REGRESSION FOR EVOLUTIONARY DIVERSIFICATION	90

LIST OF FIGURES

FIGURE 1. TAXONOMIC SCHEME BASED ON COMPARING mtDNA FROM <i>PAPIO</i> AND <i>THEROPITHECUS</i>	2
FIGURE 2. MAP OF AFRICA SHOWING THE APPROXIMATE LOCALITY OF EXTANT <i>PAPIO</i> AND <i>THEROPITHECUS</i>	8
FIGURE 3. MAP OF AFRICA SHOWING THE APPROXIMATE COLLECTION LOCALITIES FOR CRANIA	22
FIGURE 4. FRONTAL, LATERAL, AND VENTRAL ILLUSTRATION OF LANDMARKS	27
FIGURE 5. PLOT OF PRINCIPLE COMPONENT SCORES FOR PC 1 AND 2	51
FIGURE 6. PLOT OF PRINCIPLE COMPONENT SCORES FOR <i>P. URSINUS</i>	52
FIGURE 7. PLOT OF PRINCIPLE COMPONENT SCORES FOR PC 3 AND 4	53
FIGURE 8. PLOT OF PRINCIPLE COMPONENT SCORES FOR PC 3 AND 4 WITHOUT <i>T. GELADA</i>	54
FIGURE 9. PLOT OF CANONICAL VARIATES SCORES FOR CV 1 AND 2	59
FIGURE 10. PLOT OF CANONICAL VARIATE SCORES FOR CV 3 AND 4	60
FIGURE 11. DISTANCE BETWEEN SPECIES	63
FIGURE 12. UPGMA CLUSTER ANALYSIS	66
FIGURE 13. <i>P. ANUBIS</i> SPECIMENS SEPERATED BY SEX	68
FIGURE 14. <i>P. CYNOCEPHALUS</i> SPECIMENS SEPERATED BY SEX	69
FIGURE 15. <i>P. URSINUS</i> SPECIMENS PLOTTED IN THE TWO DIMENSIONAL COMPONENT SPACE	71
FIGURE 16. GEOGRAPHIC LOCALITY OF <i>P. URSINUS</i> CLUSTERS FOR PC 1 AND 2	73
FIGURE 17. PHYLOGENY OF THE RELATIONSIPS AMONG <i>PAPIO</i> AND <i>THEROPITHECUS</i>	88
FIGURE 18. GRAPHS OF REGRESSION FOR THE TEST OF GENETIC DRIFT FOR ALL SPECIMENS	91
FIGURE 19. GRAPH OF REGRESSION FOR THE TEST OF GENETIC DRIFT WITH <i>PAPIO</i> ONLY	91
FIGURE 20. GRAPH OF REGRESSION FOR THE TEST OF GENETIC DRIFT WITH <i>PAPIO</i> WITHOUT <i>P. KINDAE</i>	92

CHAPTER 1: INTRODUCTION

“There is no consensus among biologists about what a species is, nor about how a species arises. However, no matter what species concepts are applied, inferences about primate species depend largely on interpreting variation within and among primate groups”
(Albrecht & Miller, 1993:123-124).

WHY STUDY VARIATION?

Variation and variability are central concepts in biology and anthropology. Understanding variation, both within and between taxa, was the core thinking of Ernst Mayr (1982) and Sewall Wright (1968), two of the founding fathers of the modern synthesis (Hallgrímsson & Hall, 2005). There are two primary reasons for studying variation: 1) to better understand the taxonomic relationships among populations, and 2) to address questions of evolutionary diversification, which may allow us to distinguish between divergent processes responsible for such diversification (e.g. drift versus selection; Ackermann & Cheverud 2002, 2004). In order to address these issues, the primary focus of this research is to investigate within and between group morphological variation in a broadly distributed primate group – the baboons.

This research aims to document intra- and inter-taxon variation in craniofacial morphology in the living species of *Papio*, as well as the closely related species *Theropithecus gelada*. This study will also compare patterns of morphological integration in the cranium, and

will test whether drift can explain evolutionary diversification. Such studies of craniofacial anatomy of inter- and intra-species variation can contribute to understanding baboon evolution more broadly, particularly in conjunction with other studies of baboon behavior, ecology and systematics.

BABOON SYSTEMATICS AND TAXONOMY

“...among those who care about baboon systematics there is a bewildering variety of opinions about the number (5, 6, 14, 18?) and rank (species, subspecies, semispecies, superspecies?) of baboon taxa that should be recognized” (Jolly, 2003:1004-5).

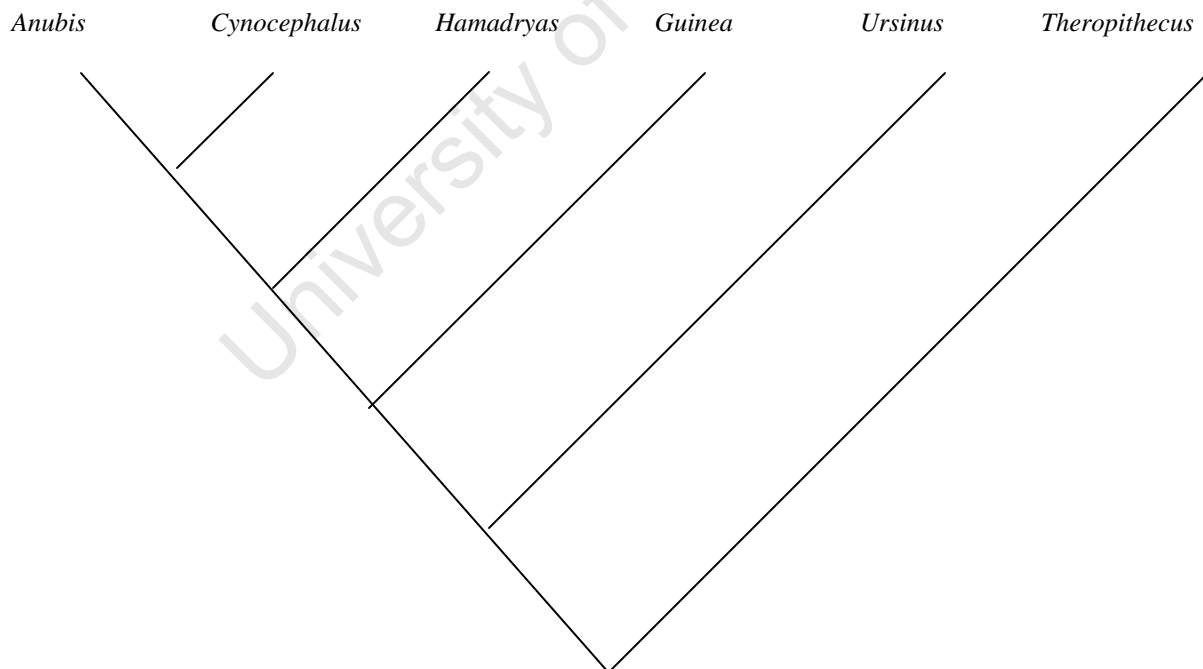


FIGURE 1. Taxonomic scheme based on the comparisons of mtDNA from *Papio* and *Theropithecus*. Taken from Newman et al., 2004.

Baboons (Genus *Papio*) are widespread, diverse, open-country catarhines comprised of a number of allotaxa; whether these allotaxa are distinct at the subspecies or species level is a matter of ongoing debate (Jolly 2001). Because extant baboons are primarily terrestrial and not restricted to any ecological niche, they do not fall into neat taxonomic categories as many tree-living species do (Washburn, 1950). Additionally, behavioral and dietary plasticity and cross-population hybridization have led to greater confusion regarding their taxonomic status. Indeed, all baboon allotaxa appear to be capable of producing viable and fertile offspring when they interbreed (Newman et al., 2004), and naturally occurring hybrid zones have been found wherever interfaces have been observed (Jolly, 1993).

Given these difficulties, most researchers either divide the genus into five species: *Papio ursinus*, *P. papio*, *P. anubis*, *P. cynocephalus*, and *P. hamadryas*, or recognize five subspecific categories under *P. hamadryas*. In an in-depth discussion of baboon systematics and biogeography, Jolly (1993) takes the latter approach, referring to the main “forms” as subspecies, and stating that these recognizable forms “comprise a single, continuous series, in which, for the most part, neighboring populations differ from each other in orderly, stepped-cline fashion” (Jolly, 1993:78). More recently, Kamilar (2006) revisited Jolly’s (1993) hypothesis regarding the number of baboon species and included the recent work of Rogers (2000), Frost et al. (2003) and Newman et al. (2004). In his analysis, Kamilar (2006) sought to quantitatively examine the ecological niche of savannah baboons and to examine how their ecological variation co-varied with geography. His analysis supported Jolly’s conclusion that savannah baboon subspecies are ecologically similar (Kamilar, 2006). Analyses revealed that each subspecies displayed learning in certain niche characteristics (though these differences were not statistically significant) and showed a lack of separation in diet, activity, and social organization. Overall, Kamilar’s (2006)

results show that the ecological variability among savannah baboon subspecies does not exceed the ecological variation within species. He concludes that the dietary, activity budget, and social organization characteristics of baboon subspecies are shaped by environmental characteristics (Kamilar, 2006). In addition, he concludes that under the phylogenetic species concept (Craycraft, 1987), the biological species concept (Mayr, 1942), and the ecological species concept (van Valen, 1976), a single baboon species should be accepted (Kamilar, 2006).

Originally, Thorington and Groves (1970) also united all the species under *P. hamadryas* based on the biological species concept and the presence of known hybrid zones. However, more recently Groves' (2001:237-238) remarked that each species is extremely distinctive externally, and presented a multi-species taxonomy, stating that he is confident "that the five species traditionally recognized are genuinely diagnosable entities". Groves' (2001) criteria for a species are that they are the smallest diagnosable cluster of individual organisms with a similar pattern of ancestry and descent, and within which subspecies may be defined. Grubb et al. (2003) also follow Groves (2001) and recognize 5 major forms of *Papio*, particularly because of the relatively restricted nature of hybrid zones, and state that more research is needed on baboon hybrid zones.

If indeed baboons represent a single species, existing phylogenetic data do not support the notion that that species should be *P. hamadryas*. Indeed, recent work by Newman et al. (2004), found that the major taxa fall into the pattern (*Ursinus (Papio (Hamadryas (Cynocephalus + Anubis))))*), suggesting that the oldest (root) species is *Papio ursinus*, and that all baboons are most likely to have evolved from a ursinus-like ancestor (see below).

Seven "forms" are recognized in this study. Although it is recognized that the taxonomic relationships among baboons are complicated, for this study each "form" is given species

distinction because of clear morphological and geographic differences among the groups, and also because lumping all taxa into a hamadryas-like group is not consistent with the current phylogenetic information. Additionally, *P. kindae* is recognized as its own species for the purposes of this study. Although it is often considered a subspecies of *P. cynocephalus*, this decision is taken here because *P. kindae* is distinct enough morphologically to merit status as a full species under the phylogenetic species concept (Groves, personal communication). Additionally, *P. kindae* presents distinctive ontogenetic features lending more weight to full species status (Leigh, 2005).

BABOON PHYLOGENETICS

Regardless of whether baboon allotaxa are distinct at the species or subspecies level, recent genetic studies suggest that they are generally distinct, often with deep divergence times. In their phylogenetic study of *Papio*, Newman et al. (2004) suggest a southern African origin for extant *Papio*, with all extant lineages sharing a common mitochondrial ancestor at approximately 1.79 Ma. Additionally, the basal divergence of the chacma mitochondrial clade at 1.79 Ma suggest that this species is the sister group to all other extant *Papio* populations. This is followed by the divergence at roughly 1.37 Ma of *P. h. papio*, or the Guinea lineage, and then the approximately 0.619 Ma divergence of the hamadryas baboon (Newman et al., 2004). At 1.61 Ma the East African yellow and olive baboons form a “single, undifferentiated, shallow-rooted clade” (Newman et al., 2004:8) and the authors suggest three plausible explanations for this: 1) sampling error and/or limited geographic sampling, 2) yellow and olive baboons are more closely related to each other than to any other pair of taxa in the analysis, and 3) the pattern could

be the result of local gene flow in East Africa. It is important to remember, however, that this study was conducted using a limited sample, and much remains to be done to understand the genetic underpinnings of baboon divergence. In this light, the final conclusion of Rogers (2000), in a review of molecular genetic variation and population structure, remains true: little is known about the details of the broad geographic distribution of genetic variation in baboon populations, either across large areas within a subspecies, or between subspecies.

BABOON MORPHOLOGICAL VARIATION

Regardless of the taxonomic arguments discussed above, six major forms are morphologically discernable within the genus *Papio*, and in fact exhibit a great deal of phenotypic diversity. Baboons are distributed throughout most of sub-Saharan Africa, outside of the lowland forest belt (Newman et al., 2004). *P. anubis* is generally restricted to equatorial Africa in areas of semidesert, woodland, and gallery and rainforest and have a greenish agouti coat (Macdonald, 1985). Males weigh approximately 28 kilograms (kg), while females weigh in at roughly 15 kg. Males exhibit longer hair on their back than the females. Both sexes have a black face and ruffs on the checks (Napier, 1981).

P. cynocephalus occupies southern equatorial and east Africa in habitats similar to that of *P. anubis*. *P. cynocephalus* are yellowish brown to yellowish grey and their cheek hair is lighter than the hair on their head (Napier, 1981). Adult males have a mane and infants have a black coat (Altmann, 1980). Males weigh approximately 25 kg and females approximately 12 kg (Napier, 1981). In many respects, *P. anubis* resembles *P. ursinus* as much as *P. cynocephalus* (Groves, 2001). Albrecht and Miller (1993) found a morphometric affinity of *P. anubis* and *P.*

ursinus skulls and suggested how valuable a full study of *Papio* could be if it were based on osteometric and odontometric data.

P. kindae is a semi-terrestrial baboon often assumed to be a subspecies of *P. cynocephalus* (Jolly, 1993; Groves 2001). *P. kindae* is smaller than other baboons with a light build and a lanky appearance and is characterized by a short face relating to their small size (Jolly, 1993). *P. kindae* have pink circles around their eyes and the infants are born with white instead of black hair (Groves, 2001; Rogers et al., 2004; Wolfe, 2004). Groves states, “If we were presented with a series of modern baboon skulls in a fossil context, the only taxon that would be instantly distinguished as a separate species is *P. cynocephalus P. kindae*” (2001:237). Most recently, Burrell (2008) noted that *P. kindae* was genetically distinct and referred to the group as a separate species. *P. kindae* is found on the upper Zambezi in south-western Zambia. Here, the range of this taxon is adjacent to that of *P. ursinus* but there is no evidence of interbreeding (Ansell, 1978). Similarly, in Southern Angola, these two species’ ranges meet with no evidence of interbreeding (Machado, 1969). However, a wide morphocline exists between *P. kindae* and *P. cynocephalus* suggestive of extensive gene flow between species (Freedman, 1963; Jolly, 1965, 1993; Frost et al., 2003; Burrell, 2008). It has been suggested that *P. kindae* baboons may be the ancestral form of the Papionini, but more research is needed to test this hypothesis (Groves, personal communication).

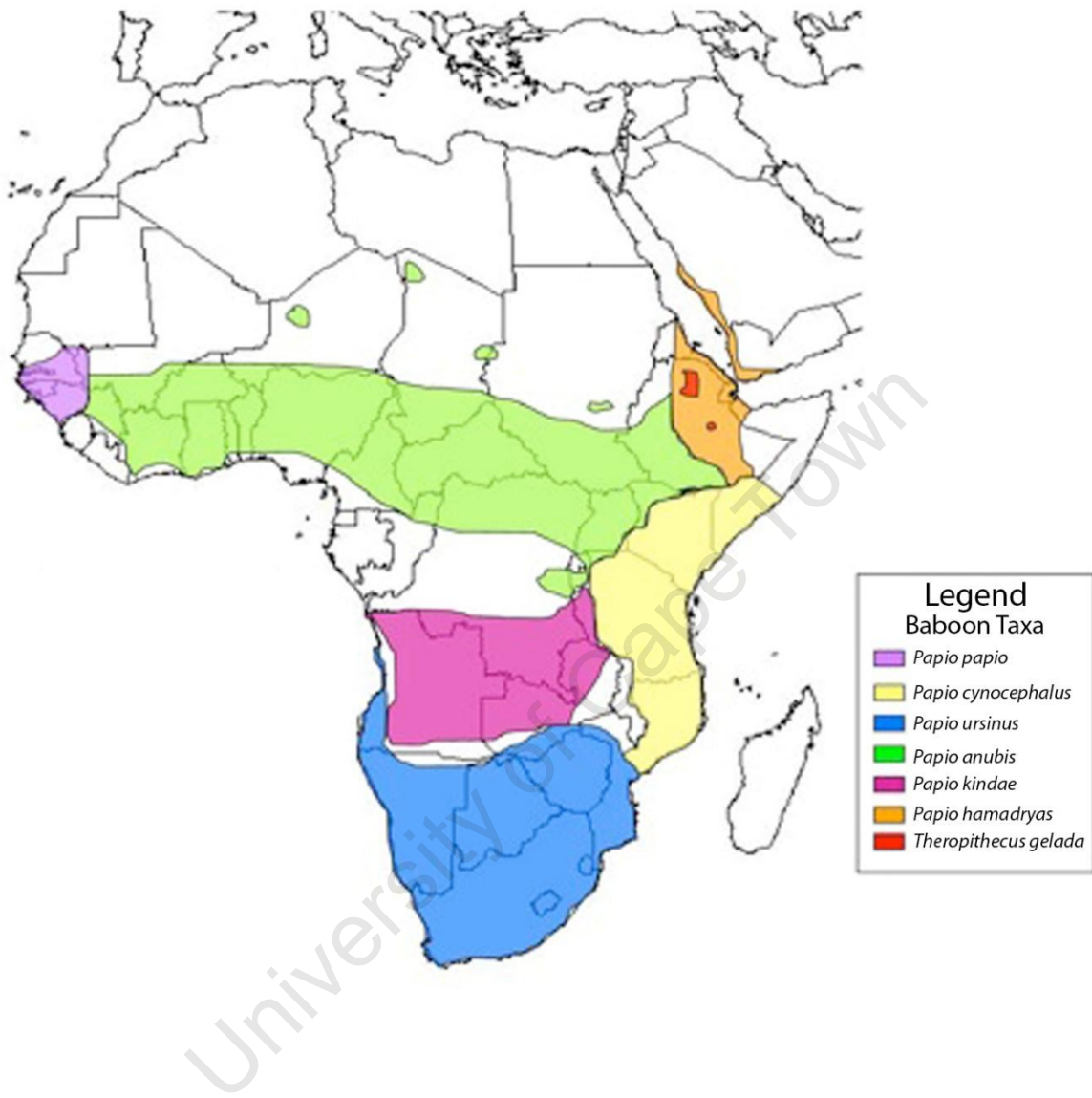


FIGURE 2. Map of Africa showing the approximate localities of extant *Papio* and *Theropithecus*. Modified from Newman et al., 2004.

P. hamadryas is not well represented in museum collections. This baboon is restricted to arid deserts and savannas of Yemen, Somalia, Ethiopia, and Saudi Arabia. The hamadryas baboon is striking phenotypically; the male has a long shoulder cape and is silvery gray in color. Female hamadryas baboons are a plain olive brown and do not have this cape. In males, the face and cushionlike skin around the ischial callosities are bright pinkish red. In contrast, females have gray skin and the skin is not swollen around the callosities (Groves, 2001). Infants are black. Males are roughly 21 kg and females are approximately 12 kg (Napier, 1981).

The Guinea baboon (*P. papio*) is found in the West African countries of Senegal, Sierra Leone, Guinea, and Mauritania (Rowe, 1996) and, like *P. hamadryas*, is not well represented in museum collections. *P. papio* has a reddish-brown coat and the adult males have a short mane. The face is a blackish red and the skin around the callosities is lighter and more pinkish (Napier, 1981; Groves, 2001).

The southern African chacma baboon, *P. ursinus*, occupies a wide variety of ecosystems, including woodland, grassland, acacia scrub, semidesert habitats, and Cape and Karoo flora (Rowe, 1996; Kingdon, 1997). Their ranges extend over much of South Africa, up to the Zambezi Valley in the east, across Botswana, and as far north as southern Angola in the west (Kingdon, 1997). *P. ursinus* is quite variable across its distribution, ranging from dark yellowish grey to dark brown to almost black. The face is typically black. Males and females weigh in at 20 kg and 17 kg, respectively (Napier, 1981). This species is common and widespread (Kingdon, 1997).

Although not in the genus *Papio*, the gelada (*Theropithecus gelada*) is closely affiliated phylogenetically and morphologically, having diverged from *Papio* around 4 Ma (Goodman et al., 1988). Indeed, this species was included in the genus *Papio* until 1979 (Groves, 1993). The

gelada is set apart from the baboons skeletally by relatively small incisors; larger, high-crowned cheek-teeth with accessory cusps; much reduced molar flare; relatively shorter but deep face; vertical ascending ramus of the mandible vertical; and very short index fingers (Jolly, 1972). Males have an enormous cape over their head and shoulders, and weigh 20 kg on average. Females weigh approximately 12kg. Both sexes have an unusual bare red hourglass shaped pectoral patch. Oestrus is signaled by swollen bumps on the skin of the females chest (Napier, 1981; Groves, 2001). In contrast to the extensive range of *Papio*, the gelada are only found in the high grasslands at 2,350 to 4,400 meters in Tigre, Begemdir, Wolle, and Shoa Provinces, Ethiopia (Groves, 2001). As a result, geladas are also not well represented in museum collections.

Although all of the baboon taxa clearly differ from one another morphologically, there is still considerable overlap, and some indication that much of the between species variation may be a function of geographic distance. In a recent geometric morphometric analysis of baboon crania, Frost et al. (2003) showed that within *Papio*, roughly 60% of the size- and sex-adjusted shape variations were explained by the specimen's origin. Data revealed a marked cline in cranial morphology, with the greatest separation between the northern and southern populations. Northern varieties (*P. papio*, *P. hamadryas*, and *P. anubis*) were distinguished by broader crania and rostra, and are less flexed overall compared to southern African baboons (*P. ursinus*, *P. kindae*, and *P. cynocephalus*) (Frost et al., 2003; Jolly, 2003).

Baboons are also intraspecifically variable. As indicated above for each species, they have a high level of sexual dimorphism for a primate, with *Papio* males being approximately 1.7 times larger than females (*P. kindae* not reported) (Rowe, 1996), and *Theropithecus* males being about 1.5 times heavier than females (Crook, 1966). Crook (1972) reported that *Papio*

hamadryas exhibited extreme sexual dimorphism in overall size, canine size, and in the mane. Indeed, Jolly (1970) noted the markedly larger canine size in males. O’ Higgins and Collard (2002) used morphometric techniques to investigate sexual dimorphism in the papionin face. They concluded that four main features distinguished males from females: 1) males have a greater degree of prognathism with relatively larger maxillae, 2) males have relatively larger, deeper muzzles, and a vertically deeper posterior aspect of the maxilla relative to the zygomatic, 3) males show a relative inferior and anterior positioning of prosthion with increased subnasal height compared to females, and 4) males show a relative narrowing of the maxilla and broadening of the zygomatic roots compared to females. These differences between males and females have been shown to arise from differences in male and female growth trajectories (Leigh & Cheverud, 1991; O’Higgins & Collard, 2002).

MORPHOLOGICAL INTEGRATION IN PRIMATE CRANIA

Olson and Miller (1958) developed the concept of integration, emphasizing a “holistic” view of the organisms’ structure and evolution. Simply defined, morphological integration is the connectivity or relationships among parts (Ackermann, 2005). By extension, this means that functionally or developmentally interacting characters would come under correlating selection and that well-integrated phenotypes might be favored under natural selection (Ackermann & Cheverud 2004b).

The skull is important in terms of studying evolution and morphological integration because it houses functionally and developmentally key regions, such as the brain, as well as organs of sight, taste, and smell. In primate studies, understanding cranial morphology and

integration is particularly important as the suite of characters most often used to explain primate relationships is found primarily in the skull (Fleagle, 1999). Additionally, a large amount of our knowledge of fossil primates is based on cranial remains (Ackermann & Cheverud, 2004b). The cranium is composed broadly of two regions distinguished on the basis of their growth pattern: the neurocranium and the face (Moore, 1981; Cheverud, 1982, 1995; Hanken & Hall, 1993; Ackermann & Cheverud (2004b) divided the cranium into three units: the cranial vault, the face, and the cranial base. The face can be further subdivided into the oral region, the nasal region, and the zygomatic region (Ackermann & Cheverud, 2004). By focusing on these regions it is possible to assess integration within the functional/developmental units, in order to understand the relationships between them and to measure the degree of total morphological integration (Marriog & Cheverud, 2001; Ackermann & Cheverud, 2004b).

Cranial variation has been studied in a multitude of primate taxa, including: *Gorilla sp.* (Ackermann, 1998; Randall, 1943; Sakka, 1985; Leigh et al., 2003; McNulty, 2003, 2004, Stumpf et al., 2003; Polanski & Franciscus, 2006; Jabbour, 2007, and see below), *Pan sp.* (Dierbach, 1986; Shea et al., 1993; Ackermann, 1998; McNulty, 2003, 2004, Hunt, 2004; Polanski & Franciscus, 2006; Leiberman et al., 2007), *Cercopithecinae* (Cheverud, 1989; Frost et al., 2003; Singleton, 2002), *Euoticus*, *Galago*, *Galagoides*, and *Otolemur* (Stump, 2007), *Pongo* (McNulty, 2003, 2004), *Archtocebus*, *Nycticebus*, and *Perodictus* (Ravosa, 1999), *Indriidae* (Gingerich & Ryan, 1979), *Hylobates* (McNulty, 2003, 2004; Hunt, 2004), *Cercopithecus* (Martin & MacLarnon, 1988; Cardini & Elton, 2008), *Colobinea* (Pan & Groves, 2004; Anderson et al., 2007), *Macaca* (Albrecht, 1978; Hunt, 2004), *Ateles* (Young, 2003, 2004), *Callithrix* (Natori, 1994), *Saguinus* (Cheverud, 1989; Hanihara & Natori, 1988, 1989; (Ackermann & Cheverud, 2000; Ackermann & Cheverud, 2002), Cheirogaleidae (Viguiet,

2004), *Saguinus* (Marroig & Cheverud, 2001) and in *Tarsius* (Dagosto et al. 2003). Yet only a subset of these studies has specifically tested hypotheses of morphological integration. In fact, the concept of and models for testing for morphological integration are fairly new to anthropology (Polanski & Franciscus, 2006). Studies of morphological integration in primates have focused primarily on New World monkeys (Cheverud, 1982, 1988, 1995, 1996; Ackermann & Cheverud, 2000; Marroig & Cheverud, 2001, 2004; Marroig et al., 2004) as well as African apes and humans (Leiberman, 2000; Strait, 2001; Gonzales-José et al., 2004; Marroig et al., 2004; Ackermann, 2005; Polanski & Franciscus, 2006). These studies have shown that while studies of cranial integration do vary, primates share a basic pattern of cranial integration across the whole cranium.

Platyrrhines in particular display integrated sets of neural traits and a strong correlation among oral traits resulting from common patterns of cranial development (Marroig & Cheverud, 2001). In a comparison of correlation matrices to expected patterns of morphological integration, Marroig et al. (2004) reveal positive and significant morphological integration in all five saki species (*Pithecia*). More specifically, a higher correlation was found among facial traits than among neural traits. The most highly integrated sets were the oral traits and well as those in the nasal region (Marroig et al., 2004).

Studies of Old World Papionins indicate that they share a similar pattern of integration in the cranium; again, phenotypic correlations are higher among functionally and developmentally related cranial traits (Cheverud, 1982). Apes and humans also reveal a similar pattern of total morphological integration, with primary contributions coming from the oral, and to a lesser extent, the zygomatic region (Ackermann, 1998, 2002, 2003a). In another such study, Polanski &

Franciscus, 2006) found that modern humans differed from African apes by being less integrated within the face, especially when it came to lower facial projection.

The differences in patterns of morphological integration between African apes and humans are probably related to overall differences in craniofacial form (Polanski & Franciscus, 2006). Commonality of integration across the primate order signifies the usefulness of quantitative analyses of patterns of morphological integration within extant species in primate paleontological studies. However, (Mitteroecker & Bookstein, 2008) explain that although humans differ in average cranial shape, the major developmental processes are shared among all hominoids. Additionally, they found that *Homo*, *Pan*, and *Gorilla* have very similar patterns of developmental integration.

Research into morphological integration suggests a complex relationship between phylogenetic relatedness, integration, and function in shaping the mammalian skull during evolution (Goswami, 2006). As Stepan (1997b) suggests, this may be because contrasting microevolutionary and macroevolutionary processes may be manipulating morphological integration. In the case of the platyrrhine primates, Marroig and Cheverud (2001, 2005) found diet to be more strongly correlated with similar patterns of morphological integration than phylogeny. Conversely, Ackermann and Cheverud (2000) found that phylogeny and integration are more highly correlated at lower taxonomic levels, within species of the platyrrhine genus *Saguinus*. In hominoids, Ackermann (2005) also found higher levels of integration in anatomical regions of the skull related to mastication. Polanski and Franciscus (2006) argued that in gorillas the integration between lower facial projection length and maximum cranial breadth is likely due to the influence of the temporalis muscle, and suggest that integration in human skulls is low. However, Mitteroecker & Bookstein (2008) argue that their results might be due to problematic

methodology, and point to a number of studies that describe tightly integrated shape features in the human cranium (Leiberman et al., 2000; Bookstein et al., 2003; González-José et al., 2004; Ackermann, 2005; Bastir & Rosas, 2005, 2006; Bastir et al., 2006).

CRANIAL DIVERSIFICATION IN PRIMATES

By studying the differences between patterns of within and between taxon variation at various levels in the phylogeny, it is possible to evaluate how these differences may reflect underlying evolutionary process (Ackermann and Cheverud, 2002, 2004a). Studies that use such approaches to distinguish the underlying evolutionary causes of cranial diversification in primates are limited, and have primarily focused on the New World monkeys: *Pithecia* (Marroig & Cheverud, 2004b; Marroig et al., 2004), *Callithrix* (Marroig et al., 2004), and *Saguinus* (Ackermann & Cheverud, 2002). Though not considered here, comparable studies have also examined evolutionary processes driving diversification within our own genus *Homo* (Ackermann & Cheverud, 2004a). Weaver et al. (2007) looked at the evolutionary processes driving differentiation between Neanderthals and modern humans, and concluded that the isolation between Neanderthal and modern human populations would have lead to cranial diversification by genetic drift.

The evolutionary relationships among the various genera of New World monkeys have been the subject of considerable debate (Cropp, 1997). Much like taxa within *Papio*, New World monkeys also span great geographical distances and occupy a diversity of habitats. Additionally, many taxa are distinguished primarily by pelage and geography, and, like *Papio*, hybrid zones

among taxa have also been reported at some contact zones. For example, hybrid zones have been reported in *Alouatta palliata* and *A. pigra* (Cortés-Ortiz et al., 2007), *Callithrix jacchus* and *C. penicillata* (Alonso et al., 1987), and observed in the Jacchus group (Coimbra-Filho et al., 1993).

The evolutionary diversification of New World Monkeys occurred over a period of more than 30 million years and is, according to Marroig and Cheverud (2004a), appropriate for a broad-scale inquiry into evolutionary processes for several reasons. One hypothesis to explain differentiation between species is that random genetic drift was the main process operating during their phenotypic evolution. Marroig and Cheverud (2001) looked at phenotypic variation among populations of New World monkeys and used this variation to make a quantitative assessment of evolutionary influences acting on different populations. Their findings include a significant correlation between phylogenetic and morphological distances, and suggest a significant connection between certain skull traits and diet. Finally, they found that functional and developmental integration could be a factor influencing covariance structure and the reason that integration has remained basically stable throughout the evolution of these primates (Marroig & Cheverud, 2001).

Cranial evolution and evolutionary processes have also been investigated in *Pithecia* (Marroig et al., 2004). Variation/covariation matrix comparisons suggest that genetic drift might be a reasonable explanation for morphological patterns in saki (*Pithecia*) cranial evolution. Ultimately, research indicates that genetic drift cannot be ruled out as an explanation for cranial morphological diversification among sakis.

Evolutionary processes in the genus *Saguinus* were examined by Ackermann and Cheverud (2002). Here, craniofacial characters were used to examine the morphological patterns of within and between taxon variance and to see if the variance was due to genetic drift or natural

selection. Results revealed that within- and between taxon morphological variation across the entire genus were not proportional and thus not likely due to genetic drift alone. However, they found that within each of the major clades, most of the interspecific variation is consistent with the pattern expected under genetic drift although differential selection may be involved in some cases (Ackermann & Cheverud, 2002).

Old World monkeys such as baboons show great variation in body size and display a diverse skull morphology that reflects varying adaptations to their way of life (Hershkovitz, 1977; Rosenberger et al., 1996; Fleagle, 1999). Addressing such questions of evolutionary diversification involves correlating patterns of morphological variation with genetic and geographic data. In this way, exploring morphological diversity in the genus *Papio* will contribute to an understanding of the relationships between populations, shed light on biogeographical shifts through evolutionary time, and will also allow us to better interpret the distribution of variation in the past. This is particularly important since we cannot use genetic information to assess variation and relatedness in the fossil record.

PROJECT GOAL

There are three foci in this study: (1) to compare patterns of variation across *Papio* and *Theropithecus*, via correlation and covariance matrix correlations and other multivariate analyses; (2) to test *a priori* hypotheses of cranial morphological integration; (3) to test against a null hypothesis of drift, in order to determine the evolutionary underpinnings of cranial divergence in the characters assessed.

Hypotheses to be tested include the following:

- Morphological differences between baboon species are greater than those among species. This study will provide insight into whether *Papio* is likely to represent multiple species, or rather one species with five subspecies.
- Patterns of variation/covariation and integration in *Papio* and *Theropithecus* fit the typical pattern of primate integration. This study will help us understand whether patterns of integration are conserved across all primates.
- Diversification in *Papio* can be explained by genetic drift alone. This study will determine whether cranial differences seen among taxa (both *Papio* and *Theropithecus*) are adaptive.

CHAPTER 2: SPECIMENS, LANDMARKS AND DATA COLLECTION

This chapter outlines the processes by which specimens and morphometric data were collected and analyzed. This includes definitions of the landmarks and linear measurements used in the project, followed by a brief overview of the hardware, software, and data collection.

SPECIMENS

Despite a vast amount of research, the taxonomy of the baboon remains controversial, as previously discussed. Most researchers either divide the genus into five species: *Papio ursinus*, *P. papio*, *P. anubis*, *P. cynocephalus*, and *P. hamadryas*, or recognize subspecific categories under *P. hamadryas*. In this study, taxa will be referred to using species-level designations, including *P. kindae*. This is for clarity, but also because molecular studies suggest that the chacma baboon is the most basal member of the clade (Newman et al, 2004), and therefore it is not clear that lumping all taxa into *P. hamadryas* is phylogenetically meaningful. *Theropithecus gelada* was also included in this study as a comparative group.

The target sample size for each of the species was 60 male and 60 female adult specimens. This goal was met in the cases of *P. ursinus*, *P. anubis*, and *P. cynocephalus*. Due to the scarcity of museum specimens, the goal was not attained in the cases of *P. papio*, *P. hamadryas*, *P. kindae*, and *T. gelada*. Sample sizes in excess of N=60 are ideal for studies of integration (Ackermann, personal communication). Therefore results from the latter specimens, and the error associated with these results, need to be considered when estimating covariance matrices (this will be discussed further in Results). Specimens whose sex was not clearly

indicated on museum labels were judged to be male or female based on highly sexually dimorphic characteristics, especially canine size and overall cranial robusticity. Table 1 provides a summary of the total numbers of specimens used in this research.

TABLE 1. Sample sizes by species and sex.

Species	Male	Female	Total
<i>Papio ursinus</i>	109	112	221
<i>P. cynocephalus</i>	78	65	143
<i>P. kindae</i>	14	27	41
<i>P. hamadryas</i>	28	1	29
<i>P. anubis</i>	120	69	189
<i>P. papio</i>	20	3	23
<i>Theropithecus gelada</i>	13	5	18
Total	382	282	664

Specimens in this study were measured from collections at The Field Museum of Natural History (Chicago, U.S.A), Smithsonian Institution- National Museum of Natural History (Washington D.C., U.S.A), Cleveland Museum of Natural History (Cleveland, U.S.A.), British Museum of Natural History (London, U.K.), Musée Royal de l'Afrique Centrale (Tervuren, Belgium), National Museums Kenya (Nairobi, Kenya), Northern Flagship Institution (Transvaal Museum - Pretoria, South Africa), University of the Witwatersrand, Department of Anatomy (Johannesburg, South Africa), and the Iziko Museums of South Africa (South African Museum - Cape Town, South Africa). Only adult specimens were included in this study. Specimens were deemed adult by full occlusion of M^3 and fusion of the sphenoccipital suture. Additionally, all zoo specimens and those with obvious pathology were excluded. Every effort was made to include only complete specimens. However, to bolster sample sizes, some incomplete or damaged specimens were included if they preserved most of the relevant morphology. Specimens with recorded sex and locality were given preference over those with no information. Figure 3 shows the approximate localities of the origin for the crania used in this analysis. Origins were obtained from museum records.

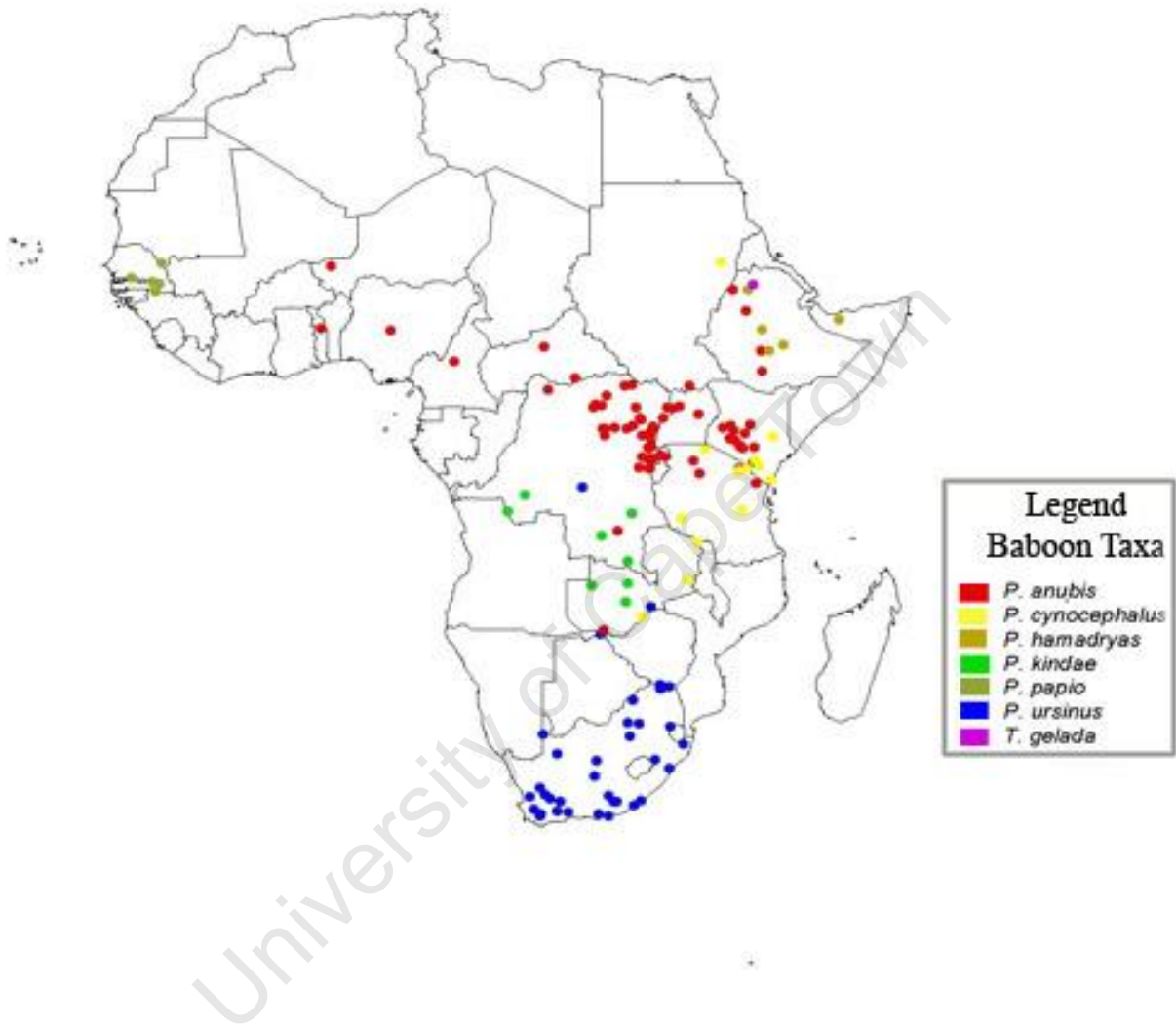


FIGURE 3. Map of Africa showing the approximate localities of crania used in this study. Points may represent more than one skull. Data derived from museum records.

LANDMARKS

The landmarks used in this project are listed and defined in Table 2; the abbreviations given for the landmarks are used throughout the text. These landmarks were chosen because they are homologous across baboon taxa and because they have been used by other researchers (Cheverud, 1995, 1996; Ackermann & Cheverud, 2000; Ackermann, 2002; Marroig & Cheverud, 2001; Singleton, 2002; Marroig et al., 2004) thus making them useful for comparative purposes. Table 3 lists the 47 linear distances calculated from these landmarks for analysis, and also lists the major functional/developmental groups to which these traits belong (Cheverud, 1988b, 1995; Ackermann, 2005; Marroig et al., 2004). The 25 landmarks, along with the 47 linear distances, were chosen to cover the skull and especially the face. Figure 4 illustrates the positions of each landmark on the baboon cranium.

DATA COLLECTION

Three-dimensional coordinates of 27 cranial landmarks were recorded using a Microscribe 3-DX digitizer. *InScribe-32* software (Immersion Corp., San Jose, CA) for Windows was used to interpret the serial input and translate three-dimensional coordinate data from the Microscribe to a Microsoft Excel spreadsheet. Coordinate data were recorded in millimeters, to four places after the decimal.

Each specimen was mounted on the platform with clay supports. Specimens were pressed into the clay until they were locked into an unmovable position. For each specimen the skull was mounted snout down and then remounted ventrally to gain access to the cranial base.

TABLE 2. Definitions of landmark data collected. Abbreviations (Abbr.) for the landmarks are used in the text and figures throughout this work. All definitions refer to a Frankfurt horizontal orientation. Taken from (Cheverud et al., 1992; Cheverud, 1995; Ackermann, 2002; McNulty, 2003).

Landmark	Abbr.	Position Definition
Midline landmarks:		
Bregma	BRE	Junction of the coronal and sagittal sutures, on the sagittal crest if necessary
Nasion	NAS	Junction of naso-frontal and inter-nasal sutures
Rhinion	RHI	Most inferior point of the inter-nasal suture
Anterior Nasal Spine	ANS	Point marking the intersection of the nasal margin with the maxillary suture
Alveolare	ALV	The most inferior midline point on the maxilla
Bilateral landmarks		
Inferior premaxillo	IPM	Most inferior point on premaxillo-maxillary suture
Premax/Max	PMM	Most superior point on the premaxillo-maxillary suture
Dacryon	DAC	Junction of lacrimal, frontal, and maxilla
Mid-Torus Inferior	MTI	Midline point on the superior margin of the orbit
Fronto-Malare Orbitale	FMO	Junction of the fronto-zygomatic suture and orbit rim
Fronto-Malare Temporale	FMT	Junction of the fronto-zygomatic suture and temporal line
ZygoOrbitale	ZYO	Junction of the zygomaxillary suture and the orbital rim
ZygoMaxillare	ZYM	Most inferior point on the zygomaxillary suture
Superior-Zygo-temporale	SZT	Most superior point on the zygomatico-temporal suture of the zygomatic arch
Zygotemporale Inferior	IZT	Most inferior point on the zygomatico-temporal suture of the zygomatic arch
Frontal/temporal	FTP	Point where the sutures of the temporal, frontal, parietal bones meet
Petrus	PET	Temporal / sphenoid junction at petrus
M ¹	M ¹	The centermost point of the buccal surface of M ¹
Distal M ³	M ³	Most distal point of M3 on the center of the alveolus
Jugular Process	JUG	Most inferior point on the jugular process

Dorsal landmarks

Lambda	L	Junction of the sagittal and lamboid suture
Asterion	A	The point where the lambdoidal, parietomastoid, and occipitomastoid sutures meet
Porion	POR	Most superior point on the margin of the external auditory meatus
Basion	BAS	Midline anterior margin of the foramen magnum
Opisthion	OPI	Midline posterior margin of the foramen magnum

University of Cape Town

TABLE 3. Linear skull measurements (distances between landmarks) and their major functional groups and cranial regions.

Measurement	Functional/developmental Group	Region
BRE-NAS	Cranial Vault	Neurocranium
BRE-MTI	Orbit/cranial vault	Neurocranium
BRE-FTP	Cranial Vault	Neurocranium
BRE-POR	Cranial Vault	Neurocranium
BRE-JUG	Cranial Vault	Neurocranium
BRE-L	Cranial Vault	Neurocranium
BRE-A	Cranial Vault	Neurocranium
NAS-RHI	Nasal	Face
NAS-FMT	Orbit	Face
NAS-FMO	Orbit	Face
NAS-FTP	Orbit/cranial Vault	Neurocranium
RHI-ANS	Nasal	Face
RHI-ZYO	Nasal	Face
RHI-ZYM	Nasal/zygomatic	Face
ANS-ALV	Oral/nasal	Face
ANS-IPM	Oral/nasal	Face
ALV-IPM	Oral	Face
ALV-PMM	Nasal/oral	Face
IPM-ZYO	Oral/zygomatic	Face
IPM-ZYM	Oral/zygomatic	Face
IPM-M ³	Oral	Face
PMM-FMT	Nasal	Face
FMT-MTI	Orbit	Face
NAS-FMO	Orbit	Face
MTI-FMO	Orbit	Face
MTI-ZYO	Orbit	Face
FMO-MTI	Orbit	Face
FMO-ZYO	Orbit/zygomatic	Face
ZYO-ZYM	Zygomatic	Face
SZT-IZT	Zygomatic	Face
IZT-FTP	Zygomatic/cranial vault	Neurocranium
IZT-M ³	Zygomatic/oral	Face
FTP-PET	Cranial vault	Neurocranium
FTP-POR	Cranial Vault	Neurocranium
PMM-FTP	Nasal	Face
FTP-L	Cranial Vault	Neurocranium
FTP-A	Cranial Vault	Neurocranium
PET-POR	Cranial base	Neurocranium
PET-M ³	Cranial base/oral	Neurocranium
PET-JUG	Cranial base	Neurocranium
PMM-PET	Nasal/base	Face
PET-L	Cranial base/vault	Neurocranium
PMM-POR	Vault/nasal	Face
IPM-L	Cranial vault/oral	Neurocranium/face
L-A	Cranial vault	Neurocranium
L-OPI	Cranial base/vault	Neurocranium
OPI-BAS	Cranial base	Neurocranium

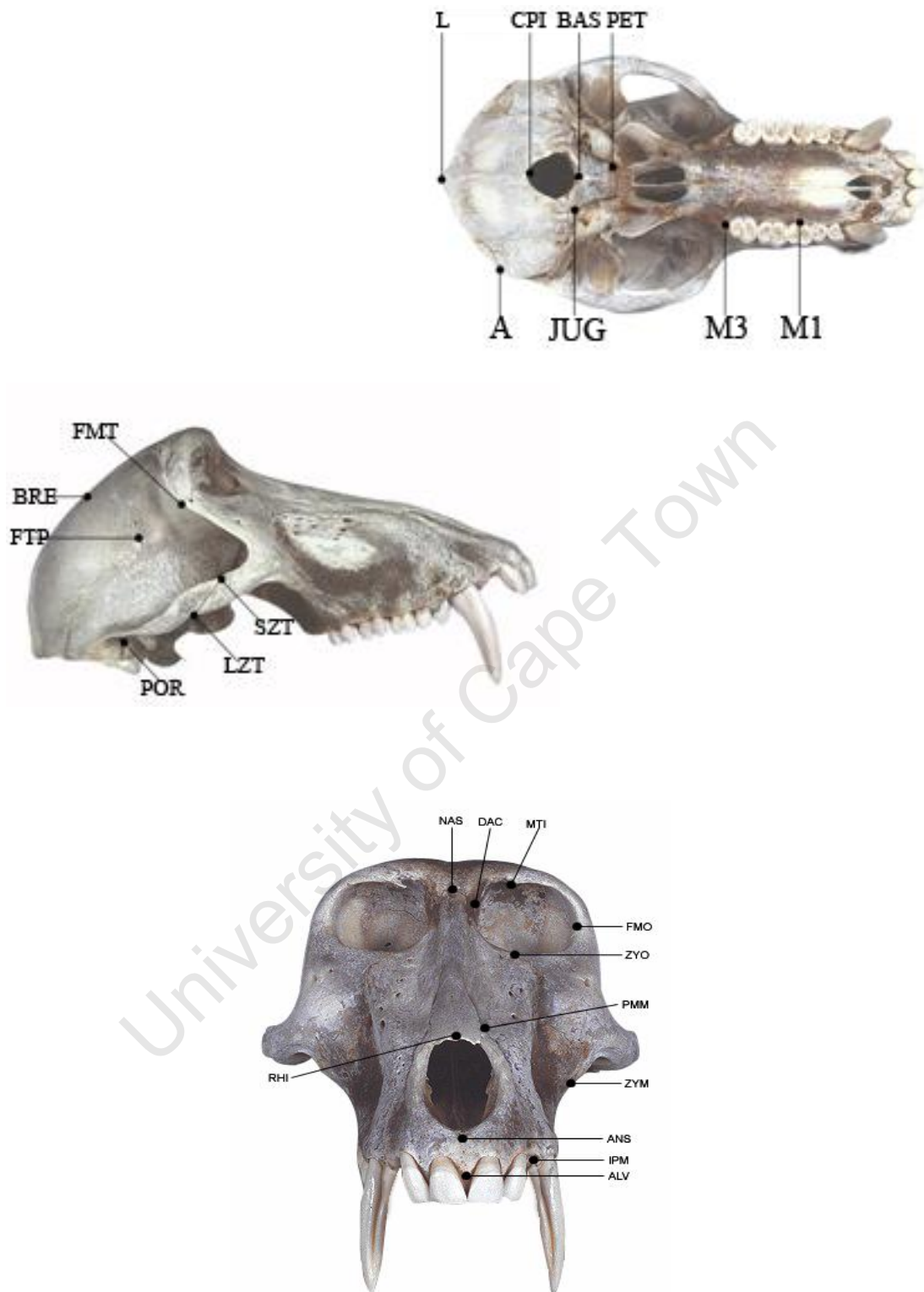


FIGURE 4. Frontal, ventral, and side illustrations of landmarks used in this project. All positions refer to a Frankfurt horizontal orientation.

CHAPTER 3: MORPHOMETRIC AND STATISTICAL METHODS

The distance data used for all analyses derive from the coordinates of three-dimensional cranial landmarks, as described in the previous section. These data were subjected to a suite of quantitative analyses, as discussed below, including principal components analysis, canonical variates analysis, comparison of correlation and variance/covariance matrices, and the calculation of Mahalanobis distances (D^2). These are standard techniques used in biometrics to explore variance among specimens and groups. Additionally, unweighted pair group method with arithmetic mean (UPGMA) and minimum spanning trees (MST) were created to visualize the relative relationships among the taxa, as calculated in the D^2 analyses. Techniques for analyzing the role of genetic drift in evolutionary diversification were drawn from published literature (Ackermann & Cheverud 2002, 2004). *Statistica*, *SAS*, and *Mathematica* were used in analyses of the data.

PRINCIPAL COMPONENT ANALYSIS

Principal component analysis is an exploratory data reduction technique. The goal of PCA is to reduce a large set of data into latent constructs (i.e. factors) based on shared properties among the individual variables. In a regression based method, data are extracted based on communalities, or shared variance. Initial output shows eigenvalues, which reflect the relative contribution of each factor explaining the variance. Eigenvalues greater than 1 are retained – indicating that they make a meaningful contribution to the model. Eigenvalues less than 1 are

ignored. The number of factors with eigenvalues greater than 1 represents the number of retained in the overall solution.

Rotation is the next analytical step, where *a priori* decisions regarding the relationship between factors are necessary. If factors are expected to represent completely unrelated unique factors, then an orthogonal rotation is used. In this instance a Varimax rotation was used. Output is indicated in various ways. Along with the eigenvalues, the percentage of variance accounted for by each factor is reported. The cumulative variance is also reported, indicating how much variance is accounted for by the solution for factors that have an eigenvalue greater than one.. The cumulative variance in the row with the last eigenvector greater than 1 should be greater than 50% to report meaningful results (Floyd & Widamen, 1995; Brown, 2006).

In order to explore shape variation across all specimens, a principal components analysis was performed on the covariance matrix of size-adjusted data for all 47 measurements. One-way analyses of variance (ANOVA) on PC scores were used to test for significant differences in cranial shape among species for each axis. Results of the PCA and the ANOVAs are shown in Table 5 for the first 10 PCs; subsequent axes comprising less than 1% each of the total group variability are not listed here. ANOVA results indicate highly significant differences between species on each eigenvector. Therefore, pairwise t-tests with a Bonferroni adjustment were performed on the least squares adjusted means for each species (see Table 6). The first four principal component axes are discussed in more detail below.

For each species, principal components analysis (PCA) was used to reduce the 47 measurement variables down to fewer underlying independent components. The primary goal of PCA is to summarize the pattern of correlations among the variables, combining variables that are correlated into independent data dimensions or principal components (Tabachnik & Fidell,

2001). In previous analyses (with all species combined), two principal components were shown to account for a large percentage of the variance in the measurement variables. Similar results were expected in each of the individual species. For each species, the number of principal components used in further analysis was determined by examining the cumulative percentage of variance accounted for by the principal components, as above. Scatterplots of the principal component scores were inspected for data clusters. With only two or three variable dimensions, potential data clusters can often be identified by eye and then formal cluster analyses can be used to confirm the result. Finally, the principal component scores for each specimen within a species were used as the attribute variables for the cluster analysis.

The hierarchical cluster analyses were interpreted by inspecting dendrograms and agglomeration coefficients. A dendrogram is a tree diagram in which each step in the hierarchical process of combining similar clusters is displayed graphically. Each clustering step also has an associated agglomeration coefficient, which is the distance between the pair of clusters that are joined at that step (Deickman, personal communication). When these values are small it indicates that the clusters combined at that step are relatively similar. If there is little clustering in the data structure the agglomeration coefficients will increase steadily at each step in the clustering hierarchy. However, in the presence of distinct clusters, there will be a marked jump in the magnitude of the agglomeration coefficients indicating that two dissimilar clusters were combined at that step. A marked change in agglomeration coefficients can be a signal that the specified number of clusters at this step should be considered for the final clustering solution.

For each principal component axis, a one-way analysis of variance (ANOVA) was computed in order to test for differences among species. When significance was found, pairwise parametric t-tests were performed in order to determine in which species such differences

occurred; a Bonferroni adjustment was applied to all probabilities computed in multiple comparison tests (e.g., t-tests). Bonferroni correction states that if the experimenter is testing N hypotheses on a set of data, then the statistical significance level that should be used for each hypothesis separately is $1/N$ times what it would be if any one hypothesis were tested. The Bonferroni correction is a safeguard against multiple tests of statistical significance on the same data. The test will appear to be significant at the $\alpha = 0.05$ level purely due to chance (Comrey & Lee, 1992).

CANONICAL VARIATES ANALYSIS

Canonical discriminate analysis is a dimension-reduction technique related to principal component analysis and canonical correlation; it uses linear combination of quantitative variables to summarize between-class variation. Following PCA, canonical variates analysis (CVA) was performed on the non-zero principal components. Non-zero principal components simply refer to the elimination of all the features that are in the direction of the eigenvectors corresponding to the smallest eigenvalues of the covariance matrix (Gilmezoglu et al., 2001). A CVA transforms the multivariate space in order to minimize within-group variability, and then performs a PCA on groups centroids (McNulty, 2003). This results in canonical variates that summarize variability among sample species, with minimal variation within them. Unlike PCA, the CVA method requires reliably known group information in order to compare within-group variances. As done in PCA, one-way ANOVA's were run on the CV scores in order to test for differences among species; t-tests with a Bonferroni correction were implemented to show where such differences occurred. Shape differences for each canonical variate were visualized using the method described above for PCA.

Cross-validations were also computed for every CVA in order to assess the robusticity of the CV's in separating groups. This involved removing each specimen, recalculating the canonical variates, and then assigning the excluded specimen to a group. Thus, cross-validation results show, for each group, the number of its components that were assigned correctly, the number assigned incorrectly, and the groups in which the later were misplaced (McNulty, 2003).

MAHALANOBIS D^2 ANALYSIS

Mahalanobis distances (D^2) were calculated between baboon species. These distances are based on covariance matrices. Mahalanobis D^2 is a useful measure for examining between-individual or between-group difference, in that it takes into consideration the variance and covariance within the sample. D^2 is also the basis for the multivariate extension of the pair-wise t-test, Hotelling's T^2 , and follows an F distribution (Reyment, 1991). Mahalanobis distance (D^2) is defined as:

$$D^2_{ij} = \sum_{r=1}^p \sum_{s=1}^p (\mu_{ri} - \mu_{ri}) v^{rs} (\mu_{ri} - \mu_{ri})$$

with p variables, r rows, and s columns where μ_1 is the vector of the means for the i^{th} population and V is the covariance matrix of that population. This formula is often adapted to measure distances between individuals (x) and population means as well as to measure distances

$$D^2 = (\chi - \mu)' v^{-1} (\chi - \mu)$$

between individuals (Manly, 1986; Ackermann, 1998).

In every case, highly significant differences were found between the species. In the case where every group difference is significant, relationships among species can only be interpreted by relative distances (see also McNulty, 2003); simply reporting that all species are different does not further our understanding of the relationships between them. To aid in the understanding of the relationships, minimum spanning trees (MSTs) were created; each MST represents the shortest tree that links together all species in the sample (McNulty, 2003). In other words, the nearest-neighbors are joined together and disjoint trees are then connected through the closest link between any of their components. MSTs are frequently projected onto canonical space as indicators of how well reduced dimensional displays represent the true canonical distance.

Mahalanobis D^2 values were also interpreted hierarchically using UPGMA cluster analysis. Clustering was performed and graphed using SAS. The unweighted pair-group method using arithmetic averages (UPGMA) was chosen as it performs well with naturally clustered groups (Sneath & Sokal, 1972). Like any clustering method, this technique initially treats each taxon as a cluster. The two closest groups are joined together into a new cluster and the total number of cluster decreases by one. This proceeds until the final two clusters are joined. UPGMA computed the distances between clusters as the average distance between all taxa in the clusters (Sneath & Sokal, 1972). Clustering takes into account all of the D^2 values when joining groups together; thus, the pairwise distances between all other taxa influence the position of each taxon in a cluster. Minimum spanning trees (MSTs) and UPGMA phenograms, as well as the distance matrix itself, are discussed in combination in order to evaluate species differences (Deickman, personal communication.).

MATRIX CREATION AND BENDING

The pattern (i.e. correlation/covariance) and magnitude (i.e. variance) of craniofacial variation in the multiple species of baboon are quantified using correlation and variance/covariance matrices. Simple Pearson correlation and covariance matrices were obtained from the 47 variables using SYSTAT and analyzed using an approach similar to that which has been described by Ackermann (2005). Because some of the matrices were based on sample sizes that were less than the number of analyzed variables, some eigenvalues of these correlation and covariance matrices were negative. These correlation and covariance matrices were corrected by “bending” (Hill & Thompson, 1978; Hayes & Hill, 1981; Jorjani et al., 1988). Bending increases the negative covariances while decreasing the positive via multiplication by a constant that approaches one, but is less than one. With this, the values change slightly, but not the overall pattern of covariation (Ackermann, 2005). This is done by first determining the eigenvalues and eigenvectors of the correlation or covariance matrix, and then multiplying the deviations of the eigenvalues from the mean eigenvalue (μ) by a constant (k); this is determined based on how much the matrix needs bending. The gelada correlation matrices were bent using 0.99999, and all others by 0.9999. The covariance matrices were all bent using 0.999999.

MORPHOLOGICAL INTEGRATION

Proportionality of phenotypic distance is of crucial importance to adequately focus on population history and structure, and it depends on the proportionality of genetic and phenotypic covariance. If phenotypic patterns are found to be relatively stable, the most probable explanation is that genetic covariance matrices are also stable. Factors like morphological integration account for such stability. Morphological integration can be studied by analyzing the relationships among morphological traits. Differences in patterns of correlation and covariation were tested for association with matrices of genetic distances (Gonzalez-José et al., 2004).

To examine morphological integration in the baboon cranium, matrix correlations were calculated between observed species correlation matrices and designed morphological integration connectivity matrices (Ackermann, 2005). Correlation matrices between the integration matrices correlations will fall between -1 and 1 , with extremes indicating high negative and positive correlation, respectively. Integration matrices were produced using the method of Ackermann and Cheverud (2000) and Ackermann (2005) (see also Cheverud, 1982, 1995, 1996; Marroig et al., 2004) and designed to evaluate morphological integration within six distinct regions of the skull (orbit, oral, nasal, zygomatic, cranial vault, and cranial base) and within the skull as a whole (total morphological integration). Connectivity matrices are constructed as follows: when two traits belong to the same developmental/functional set, a value of one is entered in the matrix; otherwise a value of zero is entered. For the total integration matrix, a one is entered if the traits belong to the same trait set; otherwise a zero is entered (Cheverud, 1995, 1996; Ackermann, 2005). The overall mean for the observed species' correlation coefficients for traits with one (positive) or zero (negative) in each of the designed

integration matrices is also calculated, in order to assess the degree to which shared developmental/functional regions influence the integration process (Marriog & Cheverud, 2001).

The significance of the correlations between the observed and the integration matrices is assessed using Mantel's test (Cheverud et al., 1989). For each comparison, the rows (and associated columns) of one matrix are selectively changed and the matrix correlation is calculated between the unaltered matrix and the adjusted matrix. This is repeated 10,000 times, to produce a distribution of matrix correlations under the null hypothesis of no structural similarity between matrices. When the observed correlation is compared to the empirically derived distribution, the percent of permutation correlations greater than or equal to the observed correlation serves as an estimate of the probability of obtaining that observed correlation. Patterns are considered similar when the observed matrix correlation exceeds 95% of the randomly generated correlations (Ackermann, 2005).

CORRELATION AND COVARIANCE PATTERNS

To test whether correlation and covariance structure is similar between species, correlation and covariance matrices (calculated as above) were compared using matrix correlations and random skewers methods, respectively. The possibility of obtaining the observed pattern of morphological variation can be evaluated by comparing within and between population V/CV matrices (Ackermann & Cheverud, 2002). The testing of correlation and covariance structures with random skewers is really an extension of correlation matrix analysis. It represents the next level of sophistication in the analyses; it does not deviate conceptually from the biologically based goals of the project – it is a hypothesis testing method that goes a level

deeper into determining the differences or similarities between cranial structure measurements (Brown, 2006; Mason, personal communication).

To estimate similarity in two separate covariance matrices, a single random selection vector is generated from a uniform distribution of values between 0 and 1, and standardized to a vector length of one. This vector is then multiplied by each of the two covariance matrices being compared, and the two resulting vectors are then correlated. This is repeated 1,000 times. These average vector correlations will fall between 0 and 1, with the extremes indicating inequality and equality in covariance structure, respectively (Cheverud et al., 1983; Cheverud, 1996; Marriog & Cheverud, 2001; Ackermann, 2002, 2005).

A resampling method of vector correlation is used to estimate the statistical significance of the random skewers results (Cheverud, 1996; Cheverud et al., 1983; Ackermann, 2002). For each species sample, a sample of size N is generated from the observations with replacement from the original data. The covariance matrices specified by the samples are then calculated and compared to each other via the random skewers method; this is repeated 1,000 times. Ninety-five percent confidence limits are generated from the distribution to determine significance (Ackermann, 2005).

Testing of correlation and covariance structures with random skewers is really an extension of correlation matrix analysis. It represents the next level of complexity in the analysis and does not deviate conceptually from the biologically based goals of the project. It is a hypothesis testing method that goes a level deeper into determining the differences or similarities between cranial structure measurements. It uses the data collected in tandem with data that is statistically generated from a program. It does this in iterations using random draws from a standard distribution and calculating the relationships. These relationships are then assessed

whether they could have occurred more or less by chance ($p < 0.05$). After the random draws have been completed it compares the differences in the data to those of the generated random draws in order to tell you the degree of meaningfulness in the comparisons (Mason, personal communication).

MATRIX REPEATABILITY AND ADJUSTED MATRIX CORRELATIONS

Variance/covariance matrices are calculated to quantify variation within populations. V/CV matrices are based on morphological distances (Ackermann, 1998). Phenotypic correlation and covariance matrices are estimated with error (Cheverud, 1996; Ackermann, 2005). To estimate and account for the impact of sampling error in the analysis, matrix repeatability (t) is determined. These estimates of repeatability are then used to calculate a theoretical maximum ($r_{\max} = \sqrt{t_1 t_2}$) expected when comparing correlation or covariance matrices, in order to adjust the observed correlation so they represent actual matrix or vector correlation (Cheverud, 1996; Ackermann & Cheverud, 2000).

Adjusted matrix/vector correlation (r_{adj}) are calculated as the observed correlation (r_o) divided by the maximum matrix/vector correlation (r_{\max}) calculated for each pairwise comparison. Repeatabilities are determined by using a resampling method of auto-correlation (Ackermann, 2002; Marroig & Cheverud, 2001). For the correlation matrices, for each species of size N , N samples are drawn from the population with replacement, and a correlation matrix calculated. This matrix is then correlated with the observed population correlation matrix using the matrix correlation method. This process is repeated 1000 times, and the average correlation

between the resampled matrices and the population matrix serves as an estimate of repeatability for each sample. For the covariance matrix, a similar method is used. A sample of size N is generated from the observations by randomly selecting N individuals with replacement from the original species data. The covariance matrix calculated from this sample is then correlated with the observed population covariance matrix using random skewers method. This process is repeated 1,000 times, and the average vector correlation between the resampled matrices and the population matrix serves as an estimate of repeatability for each sample (Cheverud, 1996; Ackermann, 2005).

ALLOMETRY

Allometry is the relation between the size of an organism and the size of any of its parts (Small, 1996). Many shape differences among closely related species are allometric – e.g. size-related. The first principal component vector in each analysis was examined in order to describe regions of positive and negative allometry. This can be done because the first principal component mainly represents size. The first principal component can also have an effect on the regression of between or within population variances (Jolicoeur, 1963; Reyment et al., 1984; Ackermann & Cheverud, 2002). In this study, each standardized component is converted into an allometry vector by dividing it by $1/\sqrt{47}$ – the expected loading if the variation were equally distributed between the 47 variables. Allometry vectors are tested for significance against isometry (loading of 1) using a standard t-test. Values that are significantly above or below 1 are interpreted as positively or negatively allometric (Ackermann & Cheverud, 2002).

Angles between vectors are useful to judge the levels of similarity in allometry among species. The angle between allometry vectors is calculated as the inverse cosine of the dot product of the two vectors divided by the vector weights, as follows:

$$\theta = \cos^{-1} (v_i v_j / w_i / w_j)$$

where v_i and v_j are the vectors being compared, w_i is the square root of the sum of the squared coefficients of vector v_i , and w_j is the square root of the sum of the squared coefficients of vector v_j . The correlation between these two vectors is the cosine of the angle between them (Cheverud & Leamy, 1985).

EVOLUTIONARY DIVERSIFICATION

The pattern and magnitude of variation within a population is tied to the variation between diverging species; evolutionary forces rely on intraspecific variation as a fuel for population diversification. According to Lande (1979, 1980) and Lofsvold (1988), the expected dispersal of average population phenotypes through random genetic drift over generations is a function of genetic variation/covariation, the effective size of the evolving populations, and the time since divergence:

$$B_t = G(t/N_e)$$

where B_t is the dispersion matrix, or between-population variance/covariance, in generation t , G is the additive genetic variance/covariance matrix in the base population from which the group of species is derived, and N_e is the effective population size of the individual taxa (Ackermann & Cheverud, 2002). When working with morphological data from contemporaneous populations, the phenotypic within-group variance/covariance (V/CV) matrix (W) is often proportional to the additive genetic V/CV (Cheverud, 1988; Roff, 1995, 1996; Koots & Gibson, 1996) and may be substituted for it so that

$$B = W(t/N_e)$$

Since t and N_e are constants for any particular comparison, the pattern of between-group phenotypic variation should be proportional to the within-group phenotypic variation ($B \propto W$), if the populations have diversified by random evolutionary processes. If these patterns are not proportional, one can suggest that other modes of evolutionary phenotypic divergence (i.e. differential selection) were at work (Ackermann & Cheverud, 2002).

Applying this to the baboons, this hypothesis suggests that if species diverged via genetic drift, then the variation pattern between species would be proportional to the morphological variation pattern within them. Under a model of genetic drift, we would expect more variable traits to drift further than the less variable ones. Conversely, if species diverged via selective processes, between- and within-group variation may or may not be proportional. Additionally, the deviation of observed divergence from proportionality may provide clues to evolutionary processes responsible for interspecific morphological divergence. Hypotheses of evolution by genetic drift are examined in a hierarchical examination of divergence among extant baboon

taxa. The intent is to provide insight into the processes of organismal evolution within the genus *Papio*, by looking at the differences between patterns of variation at various levels in phylogeny, and evaluating how these differences may reflect underlying morphological, ecological, or biogeographical shifts over evolutionary time (Ackermann & Cheverud, 2002).

University of Cape Town

CHAPTER 4: MORPHOMETRIC RESULTS OF CRANIAL MORPHOLOGY

This chapter details the results of the morphometric and statistical analyses that were performed on the baboon and gelada cranial measurements. First, I will describe variability across all species and differences among taxa by way of principal components, canonical variates analyses, ANOVA, Bonferonni tests and a variety of matrix analyses. Mahalanobis distances are also used to measure differences between taxa and clustering techniques (UPGMA and minimum spanning trees (MTIs)) are employed to visualize hierarchical relationships among species and genera.

SEXUAL DIMORPHISM

Baboons are highly sexually dimorphic, and it is necessary to reduce gross-size effects, so males and females were pooled. In order to do this, a two-sample T-test was first performed on each variable for each species. One hundred percent of the variables were shown to differ between the sexes ($p < 0.05$), with all 47 variables larger in the males than the females in every species. Using a MANOVA, it is determined that there is no sex by species interaction at the $p < 0.05$ level. For equal weighting, the differences between male and female means were therefore added to the female means for each variable (Darroch & Mosimann, 1985; Ackermann, personal communication) prior to all analyses.

PRECISION AND MEASUREMENT ERROR/REPEATABILITY

All data were collected by the author, and therefore there is no inter-observer error. In order to assess intra-observer error a repeatability study was conducted using a sample (N=29) of male and female *P. ursinus* skulls. Specimens were digitized three times each and Euclidean distances were then calculated from these landmarks. An analysis of variance (ANOVA) was performed on the 47 linear landmarks variables using SYSTAT.

The Euclidean based formula for this analysis is based on measuring the distance between observation and is modeled after the Pythagorean Theorem of $A^2 + B^2 = C^2$. The first line of the formula is the conversion of the “(X1-X2)” is analogous to A^2 above. The goal is to determine the differences between and within measurement occasions when assessing reliability. The other parts of the formula (e.g. MS_w and MS_b) are customary for difference score analysis and represent the Mean Squares Within groups and Mean Squares Between groups. V_b is the outcome scaled to the number of measurements (47). Then both major components are calculated into the last formula (t) for the final outcome (Mason, personal communication).

$$\text{Euclidean distances} = \sqrt{(X_1 - X_2)^2 + (Y_1 - Y_2)^2 + (Z_1 - Z_2)^2}$$

$$MS_w = V_e \text{ where } V_e \text{ is the residual variance, or error}$$

$$V_b = MS_b - MS_w/n \text{ where } n \text{ is the number of repeats (3)}$$

$$\text{Repeatability} = t \quad t = V_b / (V_b + V_e)$$

The repeatability of individual linear measurements is defined as the proportion of the total variance due to individual differences among the specimens rather than measurement error. It is calculated as the proportion of total variance attributable to individual differences in variation (Marriog & Cheverud, 2001; Ackermann, 1998). Repeatabilities of all single measurements (t) are greater than 99%. Overall, the estimated repeatabilities are so high that the effect of measurement error on this analysis is considered insignificant. Repeatabilities are listed in Table 4.

University of Cape Town

Table 4. Measurement Repeatability. Craniofacial measurements and the repeatability of single measurements (T_1).

Measurements	Repeatability (T_1)
BRE-NAS	0.999999084
BRE-MTI	0.99999871
BRE-FTP	0.99999857
BRE-POR	0.99999918
BRE-JUG	0.99999762
BRE-L	0.99999837
BRE-A	0.99999367
NAS-RHI	0.9999987
NAS-FMT	0.9999334
NAS-FMO	0.9999971
NAS-FTP	0.99999784
RHI-ANS	0.9999957
RHI-ZYO	0.999998
RHI-ZYM	0.999997
ANS-ALV	0.999985
ANS-IPM	0.999988
ALV-IPM	0.9999813
ALV-PMM	0.9999969
IPM-ZYO	0.99999827
IPM-ZYM	0.99999769
IPM-M ³	0.99999864
PMM-FMT	0.99998467
FMT-MTI	0.9999361
NAS-FMO	0.9999903
MTI-FMO	0.9999866
MTI-ZYO	0.9999932
FMO-FMT	0.9999214
FMO-ZYO	0.9999686
ZYO-ZYM	0.9999987
SZT-IZT	0.9999605
IZT-FTP	0.99999519
IZT-M ³	0.99999536
FTP-PET	0.9999554
FTP-POR	0.99999289
PMM-FTP	0.99999716
FTP-L	0.999999668
FTP-A	0.99999873
PET-POR	0.9999882
PET-M ³	0.9999981
PET-JUG	0.9999901
PMM-PET	0.9999991
PET-L	0.999999718
PMM-POR	0.99999887
IPM-L	0.9999807
L-A	0.99999557
L-OPI	0.999999763
OPI-BAS	0.9999864

PRINCIPAL COMPONENTS ANALYSIS

One-way analyses of variance (ANOVAs) on PC scores were used to test for statistical differences (Table 5). Pairwise t-tests with a Bonferroni adjustment were performed on the least squares adjusted means (Table 6). The first four principal components are discussed in detail below.

The first principal component represents slightly over 49% of the total variability among the sample. Principal component 2 represents slightly over 14% of the total variability among the sample. A graph of specimen scores for PC 1 and PC 2 is shown in Figure 5. The first component tends to separate *P. hamadryas*, *P. papio*, *T. gelada*, and especially *P. kindae* from other taxa, although there is some overlap. The low PC 1 for *P. kindae* makes it clear that the species separates on the basis of size. When the second component is considered, *P. kindae* baboons also stand out as being morphologically distinct in shape from all of the other taxa. Results also show *P. kindae* to be statistically different from all others. There is considerable overlap among *P. cynocephalus*, *P. ursinus*, and *P. anubis* on both PC 1 and PC 2. Interestingly, while *P. ursinus* is larger, it clearly separates into at least two, and possibly more, clusters when considering the first two eigenvectors. The most likely cause of this is sexual dimorphism. However, when PC 1 and 2 for *P. ursinus* are graphed separately and labeled according to sex (Figure 6), it becomes clear that this division is not between the sexes; this result is also seen later when principal component analysis is performed within the species. Instead, there appear to be two distinct morphs within chacma baboons; the possibility that these morphs represent geographically distinct groups will be explored further in the next section. On PC 2, there is also a less-pronounced separation of shape in *P. cynocephalus* into 2 groups. Both these separations

could also be due to high sample sizes for these two taxa, and therefore a more accurate representation of morphological variability within the species.

Principal component 3 (Figure 7) represents 5.44% of the total variability among the sample, while PC 4 represents 4.67%. *Theropithecus* is clearly separated from *Papio* on the third component. *P. ursinus* is also somewhat separated from the other species (PC 4) although the taxon does cluster somewhat with *P. kindae*. When plotted without *T. gelada* (Figure 8), *P. anubis*, *P. cynocephalus*, and *P. ursinus* cluster together with *P. kindae* and *P. papio*, and *P. hamadryas* separating out on PC 3. While the first principal component account for as much of the variability in the data as possible, and each succeeding component accounts for as much of the remaining variability as possible, it is interesting here that it requires 14 PC's to explain 90% of the observed variance.

University of Cape Town

TABLE 5. Summary of PCA and ANOVA results for the first 14 principal component axes. PCA results give the statistics for the eigenvalues, the proportion of variance explained by each component, the cumulative proportion of the variance summarized by each PC and those preceding it. One-way ANOVAs were performed on each axis to test for significant differences among species; F-values and probabilities are given for tests of the null-hypothesis.

	<i>PRINCIPAL COMPONENTS ANALYSIS</i>			<i>ANALYSIS OF VARIANCE</i>	
	Eigenvalue	Variance Explained	Cumulative Variance	F value	Pr > F
PC1	23.12	49.199	49.199	86.37	<0.0001
PC2	6.80	14.478	63.677	3.67	<0.001
PC3	2.56	5.437	69.114	351.05	<0.0001
PC4	2.20	4.671	73.785	108.12	<0.0001
PC5	1.34	2.841	76.625	24.40	<0.0001
PC6	1.21	2.573	79.198	21.74	<0.0001
PC7	1.00	2.127	81.325	5.83	<0.0001
PC8	0.78	1.662	82.998	6.11	<0.0001
PC9	0.73	1.559	84.547	8.48	<0.0001
PC10	0.69	1.471	86.018	2.54	<0.05
PC11	0.65	1.376	87.393	4.50	<0.0001
PC12	0.60	1.263	88.656	2.92	<0.01
PC13	0.55	1.161	89.817	6.01	<0.0001
PC14	0.51	1.094	90.911	2.77	<0.05

TABLE 6. Results of t-tests for pairwise comparisons between PC's 1-4. Bonferroni adjusted p-values are given in the lower rectangles. * indicates significance at $\alpha = 0.05$

PC 1	<i>P. anubis</i>	<i>P. cyno</i>	<i>P. hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>P. ursinus</i>	<i>T. gelada</i>
<i>P. anubis</i>		*	*	*	*	*	*
<i>P. cyno</i>	0.010		*	*	*	*	*
<i>P. hama</i>	<0.001	<0.001		*	NS	*	NS
<i>P. kindae</i>	<0.001	<0.001	<0.001		*	*	*
<i>P. papio</i>	<0.001	<0.001	1.000	<0.001		*	NS
<i>P. ursinus</i>	<0.001	<0.001	<0.001	<0.001	<0.001		*
<i>T. gelada</i>	<0.001	<0.001	1.000	0.005	1.000	<0.001	
PC 2	<i>P. anubis</i>	<i>P. cyno</i>	<i>P. hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>P. ursinus</i>	<i>T. gelada</i>
<i>P. anubis</i>				*		*	
<i>P. cyno</i>	0.286						
<i>P. hama</i>	1.000	1.000					
<i>P. kindae</i>	0.004	0.166	0.088				
<i>P. papio</i>	1.000	1.000	1.000	0.276			
<i>P. ursinus</i>	0.021	1.000	1.000	0.266	0.292		
<i>T. gelada</i>	1.000	1.000	1.000	1.000	1.000	1.000	
PC 3	<i>P. anubis</i>	<i>P. cyno</i>	<i>P. hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>P. ursinus</i>	<i>T. gelada</i>
<i>P. anubis</i>		*		*	*	*	*
<i>P. cyno</i>	0.048		*	*	*	*	*
<i>P. hama</i>	0.055	<0.001		*			*
<i>P. kindae</i>	<0.001	<0.001	<0.001			*	*
<i>P. papio</i>	<0.001	<0.001	1.000	0.134			*
<i>P. ursinus</i>	<0.001	<0.001	1.000	<0.001	1.000		*
<i>T. gelada</i>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
PC 4	<i>P. anubis</i>	<i>P. cyno</i>	<i>P. hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>P. ursinus</i>	<i>T. gelada</i>
<i>P. anubis</i>				*		*	*
<i>P. cyno</i>	1.000			*		*	*
<i>P. hama</i>	0.063	0.856				*	*
<i>P. kindae</i>	<0.001	<0.001	0.050		*		*
<i>P. papio</i>	1.000	1.000	1.000	<0.001		*	*
<i>P. ursinus</i>	<0.001	<0.001	<0.001	0.750	<0.001		*
<i>T. gelada</i>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	

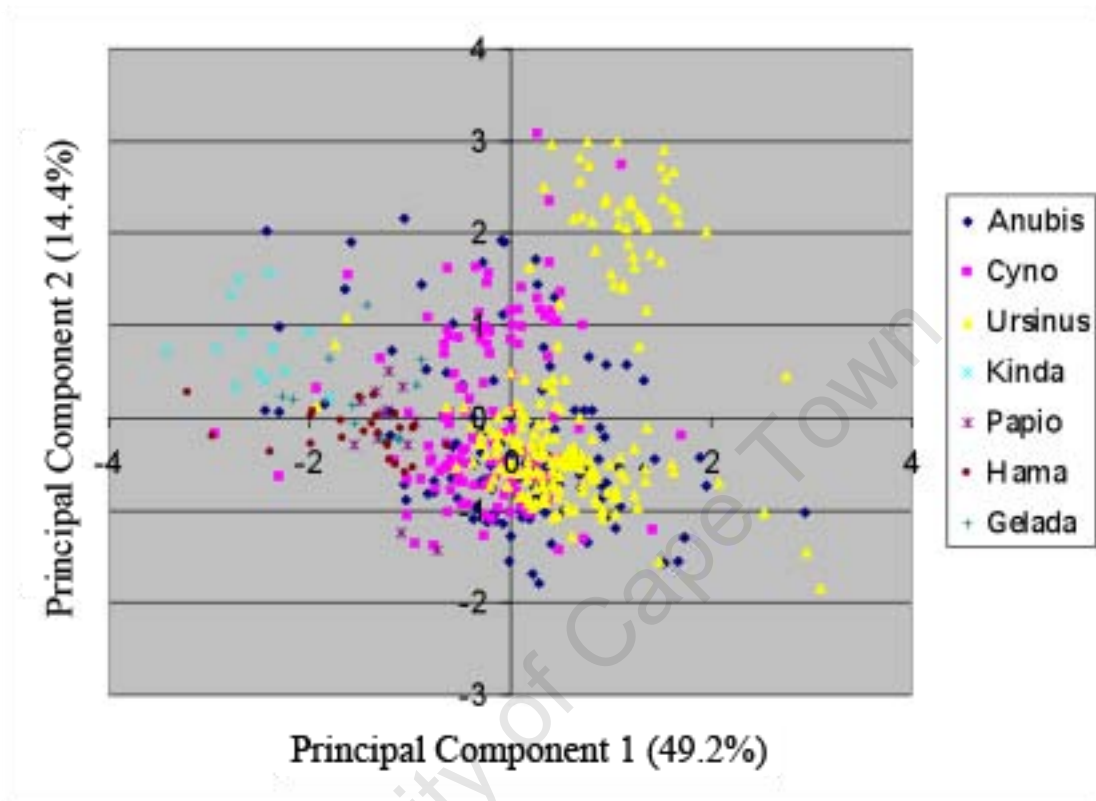


FIGURE 5. Plot of scores for PC 1 and PC 2. PC 1 represents 49.2% of the variability and PC 2, 14.4%.

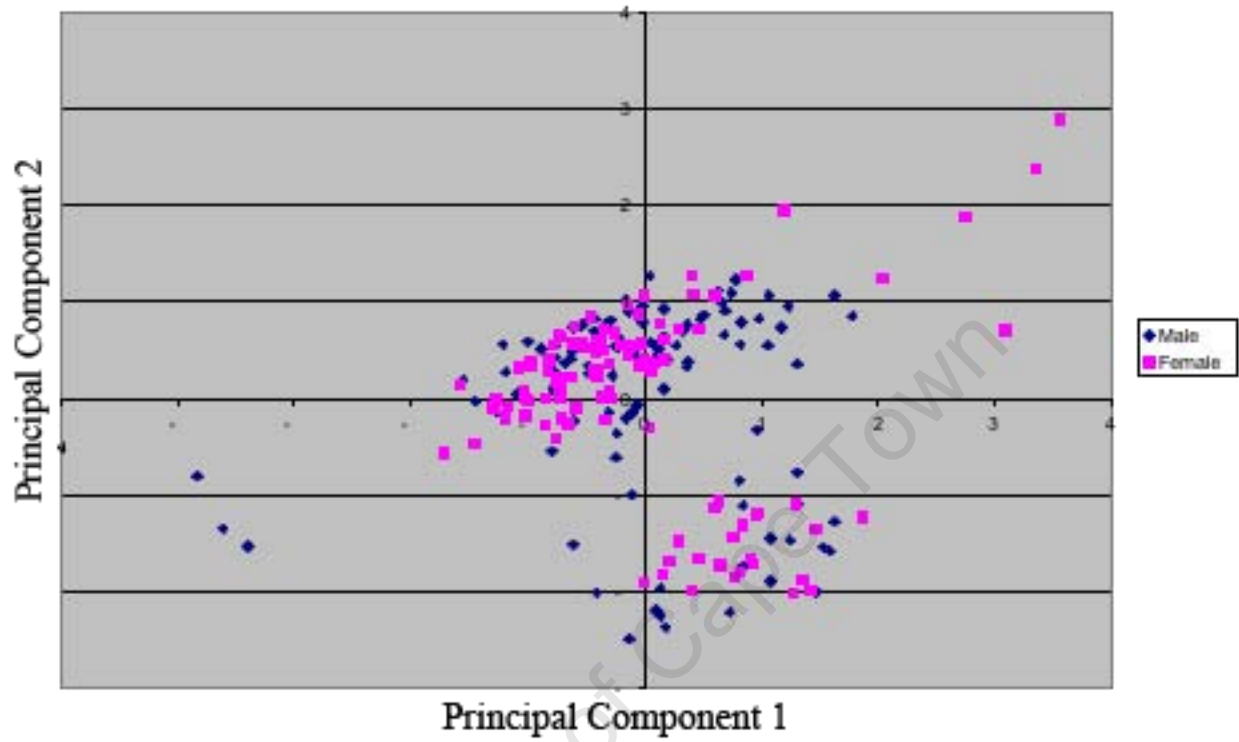


FIGURE 6. Plot of scores for PC 1 and PC 2 for *P. ursinus* males and females.

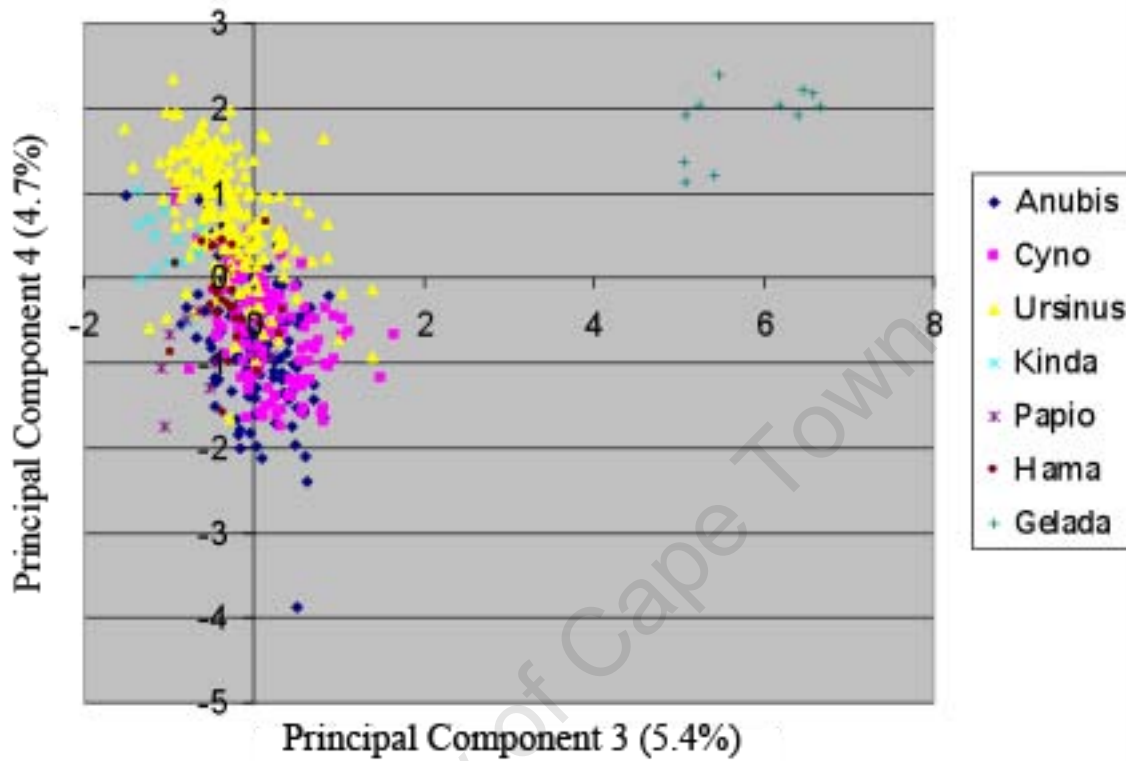


FIGURE 7. Plot of principal component scores for PC 3 and PC 4. PC 3 clearly separates *Theropithecus* and *Papio* specimens. PC 4 largely separates *P. ursinus* from the rest of *Papio*.

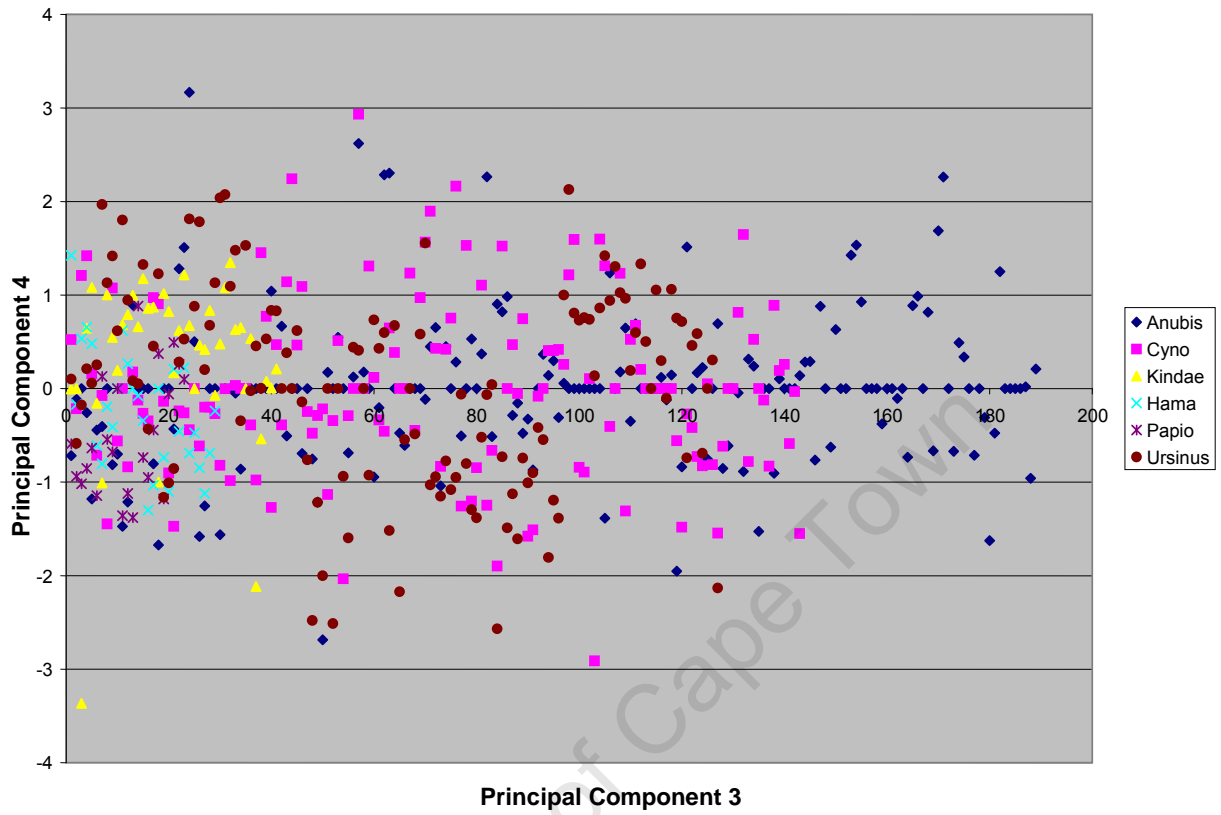


FIGURE 8. Plot of principal components 3 and 4 without *T. gelada*.

CANONICAL VARIATES ANALYSIS

Almost 99% of the variability is represented by canonical variates 1-4. ANOVAs conducted on CV scores found highly significant differences among groups for each eigenvector. Both CVA and ANOVA results are listed in Table 8. A cross-validation was computed to assign each specimen to a species based on discriminant functions computed from all other specimens. Results of this (Table 8) indicate that these data are robust for discriminating among these species; 100% of *P. kindae* specimens were correctly assigned to the correct category and 99% of *P. ursinus* were correctly assigned to the correct species. These results are not surprising given the small *P. kindae* baboon. Out of the remaining species, *P. anubis* and *P. cynocephalus*, were assigned correctly 87% and 90% of the time, respectively. The remainder of the time these species were assigned to the other species (*P. cynocephalus* or *P. anubis*). Overall, specimens were assigned to the correct species 93% of the time. Given the geographic proximity of the respective pairs and the presence of hybrid zones, a certain percentage of incorrect assignments are perhaps not surprising. For example, the incorrect assignments of *P. cynocephalus* and *P. anubis* make sense. However, the assignments of *P. anubis* to *P. kindae* and *P. papio* could be due to size factor (i.e. a small *P. anubis* baboon).

Pairwise t-tests with a Bonferroni adjustment were also computed (see Table 9). *T. gelada* has a very large distance compared to the other species. This might explain why pairwise t-tests for CV's 1-4 are only significant between *T. gelada* and the other species. One explanation for the large distance from *Papio* and *Theropithecus* is the divergence date of 3.75 Ma (Newman et al., 2004).

TABLE 7. Summary of CVA and ANOVA results. CVA results give statistics for the latent roots of the among-groups variance (eigenvalues), the proportion of variance explained by each variate, and the cumulative proportion of variance summarized by that CV and those preceding it. One-way ANOVAs were performed on each axis to test for significant differences among species; F-values and probabilities are given.

	<i>CANONICAL VARIATES ANALYSIS</i>			<i>ANALYSIS OF VARIANCE</i>	
	Eigenvalue	Proportion	Cumulative	F value	Pr > F
CV 1	171.39	94.70	94.70	14339.94	<0.0001
CV 2	5.47	3.02	97.73	457.53	<0.0001
CV 3	1.59	0.88	98.60	132.77	<0.0001
CV 4	1.10	0.61	98.21	92.11	<0.0001
CV 5	0.91	0.50	99.71	75.89	<0.0001
CV 6	0.52	0.29	100	43.52	<0.0001

TABLE 8. Cross-validation results from CVA. Cases in row categories classified into columns.

Species	Anubis	Cyno	Hama	Kindae	Papio	Ursinus	Gelada	Correct
Anubis	105	9	2	3	2	0	0	87%
Cyno	7	111	2	1	0	2	0	90%
Hama	1	0	24	0	0	0	0	96%
Kindae	0	0	0	13	0	0	0	100%
Papio	1	1	0	0	10	0	0	83%
Ursinus	2	1	0	0	0	202	0	99%
Gelada	2	0	0	0	0	0	9	82%
Total	118	122	28	17	12	204	9	93%

TABLE 9. Results of pairwise T-tests between species for CV's 1-4. Bonferroni adjusted p-values are given in the lower rectangle. * indicates significance at $\alpha = 0.05$.

CV 1	<i>P. anubis</i>	<i>P. cyno</i>	<i>P. hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>P. ursinus</i>	<i>T. gelada</i>
<i>P. anubis</i>							*
<i>P. cyno</i>	1.0000						*
<i>P. hama</i>	1.0000	1.0000					*
<i>P. kindae</i>	1.0000	1.0000	1.0000				*
<i>P. papio</i>	1.0000	1.0000	1.0000	1.0000			*
<i>P. ursinus</i>	1.0000	1.0000	1.0000	1.0000	1.0000		*
<i>T. gelada</i>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
CV 2	<i>P. anubis</i>	<i>P. cyno</i>	<i>P. hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>P. ursinus</i>	<i>T. gelada</i>
<i>P. anubis</i>			*			*	*
<i>P. cyno</i>	1.000		*			*	*
<i>P. hama</i>	0.027	0.008				*	*
<i>P. kindae</i>	0.526	0.274	1.000			*	*
<i>P. papio</i>	1.000	1.000	1.000	1.000		*	*
<i>P. ursinus</i>	<0.001	<0.001	<0.001	<0.001	<0.001		*
<i>T. gelada</i>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
CV 3	<i>P. anubis</i>	<i>P. cyno</i>	<i>P. hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>P. ursinus</i>	<i>T. gelada</i>
<i>P. anubis</i>		*	*	*	*	*	*
<i>P. cyno</i>	<0.001		*	*	*	*	*
<i>P. hama</i>	<0.001	<0.001		*		*	*
<i>P. kindae</i>	<0.001	<0.001	<0.001		*		
<i>P. papio</i>	0.002	<0.001	1.000	<0.001		*	*
<i>P. ursinus</i>	<0.001	<0.001	<0.001	1.000	<0.001		
<i>T. gelada</i>	0.005	<0.001	<0.001	1.000	<0.001	1.000	
CV 4	<i>P. anubis</i>	<i>P. cyno</i>	<i>P. hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>P. ursinus</i>	<i>T. gelada</i>
<i>P. anubis</i>		*	*	*	*	*	*
<i>P. cyno</i>	<0.001		*		*		
<i>P. hama</i>	<0.001	<0.001		*	*	*	*
<i>P. kindae</i>	<0.001	0.652	<0.001				
<i>P. papio</i>	<0.001	0.009	<0.001	1.000		*	*
<i>P. ursinus</i>	<0.001	1.000	<0.001	0.124	0.001		
<i>T. gelada</i>	0.001	1.000	<0.001	0.651	0.033	1.0000	

CV 1 summarizes 91% of the variation among groups in this sample. CV 1 largely separates *Papio* from *Theropithecus*. Again, this is to be expected given their divergence dates. However, CV 1 does not separate any *Papio* species, but CV 2 does separate out *P. ursinus* on a linear cluster at the positive pole. CV's 2-4 collectively explain only 7.68% of variability. Figures 9 and 10 plot the scores for each specimen on the first two axes. Although not a strong separation, and considerable overlap, CV 3 separates *P. cynocephalus*, *P. ursinus*, *P. anubis*, and *P. hamadryas* with *P. cynocephalus* gathering at the negative pole, *P. anubis* at the positive and *P. ursinus* clustering at zero. *P. cynocephalus* and *P. ursinus* overlap considerably at CV 4 clustering at zero. *P. hamadryas* separates out at CV 4 and clusters negatively.

University of Cape Town

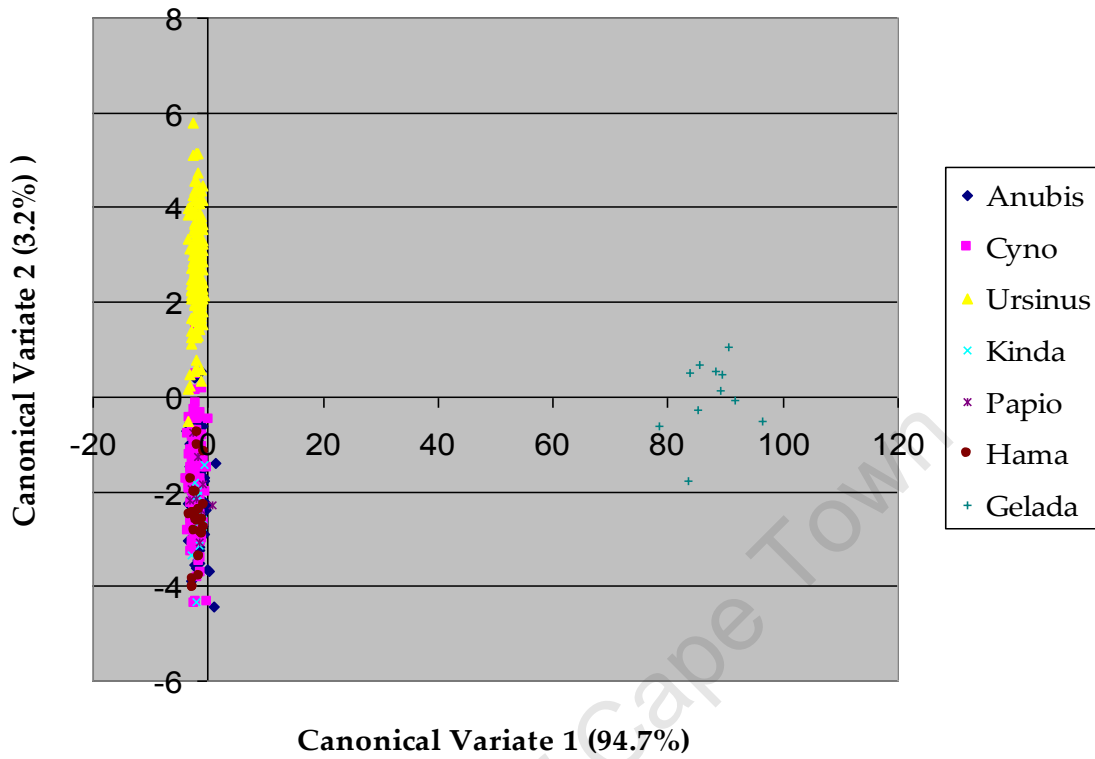


FIGURE 9. Plot of canonical variate scores for CV 1 and CV 2.

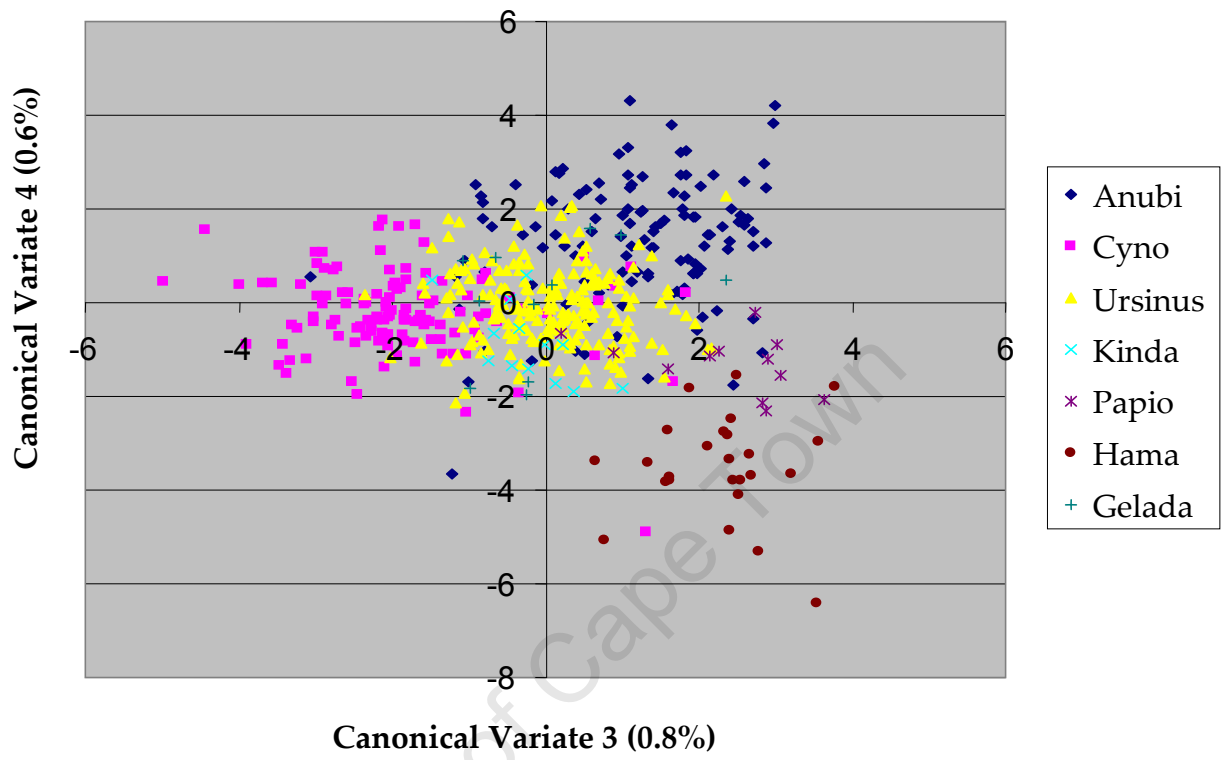


FIGURE 10. Plot of canonical variate scores for CV 3 and CV 4.

MAHALANOBIS DISTANCES (D^2) BETWEEN SPECIES

As expected, *T. gelada* has the greatest distance from the other species (an average of 3772 D^2 distances; Table 10). Excluding *T. gelada*, *P. kindae* has the greatest average distance to all other species (37.84, range = 21.99-49.97). While *P. kindae* is closest to *P. cynocephalus*, this distance is nevertheless significant, and is in fact greater than the distances between a number of the other taxa, supporting the notion that *P. kindae* is morphologically (and perhaps taxonomically) distinct from *P. cynocephalus*.

Much of the variation in distances observed can be attributed to geographic proximity. For example, *P. cynocephalus* has a close geographic proximity to *P. anubis* and *P. ursinus* (9.86 and 22.65, respectively). Further in geographic proximity, *P. ursinus* has high Mahalanobis distances to both *P. papio* and *P. hamadryas* (42.14 and 35.47, respectively). All distances are significant at $P < 0.0001$; e.g. all of these species are significantly different from each other.

Defrise-Gussenhoven (1967) showed that D between pairs of individuals drawn randomly from a population will be distributed as $\sqrt{(2p-1)}$ with a variance of 1, where p is the number of dimensions. In this instance $p=47$, so the random expectation for the D between any two crania drawn from the same species is $\sqrt{(2 \cdot 47 - 1)} = 9.64$. This random expectation is used to test whether the distance between pairs of crania is greater than would be expected if they were drawn from a single population. There are 21 pairwise distances between six species, all of which are significant at the 0.05 level or below (Table 10).

Cluster analysis is used to sort specimens into groups based on similarity of attribute variable scores (in this case principal component scores). Several hierarchical clustering algorithms (UPGMA between groups, UPGMA within groups, & Ward's method) (Ward, 1963)

with various distance measures (squared Euclidean distance, Euclidean distance, & Mahalanobis distance) were used to explore clustering within these datasets. All methods revealed similar patterns of results. UPGMA cluster analysis and MST (Table 11, 12 & Figure 11, 12) indicate the same results as Newman et al. (2004) whose results indicate that the major baboon clades fit the pattern (*P. ursinus* (*P. papio* (*P. hamadryas* (*P. cynocephalus* + *P. anubis*))))).

TABLE 10. The following table summarizes Mahalanobis distances between the 6 species and their p-values (in brackets).

Species	<i>P. anubis</i>	<i>P. cyno</i>	<i>P. hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>P. ursinus</i>	<i>T. gelada</i>
<i>P. anubis</i>							
<i>P. cyno</i>	9.86 (<0.0001)						
<i>P. hama</i>	21.01 (<0.0001)	26.13 (<0.0001)					
<i>P. kindae</i>	28.09 (<0.0001)	21.99 (<0.0001)	49.97 (<0.0001)				
<i>P. papio</i>	27.11 (<0.0001)	33.62 (<0.0001)	32.87 (<0.0001)	50.40 (<0.0001)			
<i>P. ursinus</i>	20.41 (<0.0001)	22.65 (<0.0001)	35.47 (<0.0001)	38.76 (<0.0001)	42.14 (<0.0001)		
<i>T. gelada</i>	3785.00 (<0.0001)	3751.00 (<0.0001)	3780.00 (<0.0001)	3747.00 (<0.0001)	3801.00 (<0.0001)	3764.00 (<0.0001)	

TABLE 11. Minimum spanning tree (MST) based on the values displaying the shortest distances that link together all species.

		A	B	C	D	E	F
		<i>P. anubis</i>	<i>P. cynocephalus</i>	<i>P. hamadryas</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>P. ursinus</i>
A	<i>P. Anubis</i>						
B	<i>P. cynocephalus</i>	9.856					
C	<i>P. hamadryas</i>	21.013	26.128				
D	<i>P. kindae</i>	28.087	21.987	49.972			
E	<i>P. papio</i>	27.112	33.617	32.867	50.396		
F	<i>P. ursinus</i>	20.412	22.647	35.467	38.757	42.139	
G	<i>T. gelada</i>	3785	3751	3780	3747	3801	3764

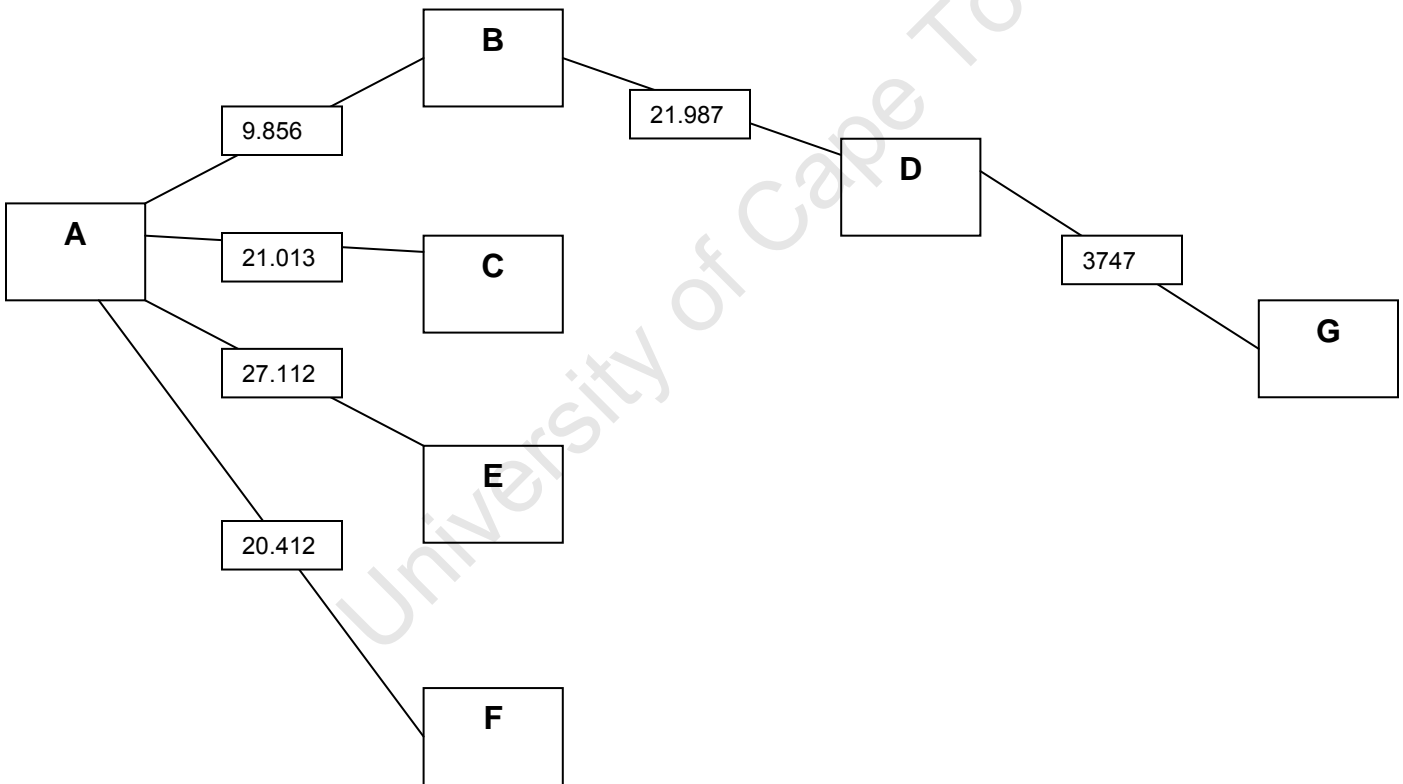


FIGURE 11. Diagram depicting the shortest distances that link together all species.

TABLE 12. UPGMA cluster analysis.

		A	B	C	D	E	F	G
		<i>P. anubis</i>	<i>P. cyno</i>	<i>P. hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>P. ursinus</i>	<i>P. gelada</i>
A	<i>P. Anubis</i>							
B	<i>P. cyno</i>	9.856						
C	<i>P. hama</i>	21.013	26.128					
D	<i>P. kindae</i>	28.087	21.987	49.972				
E	<i>P. papio</i>	27.112	33.617	32.867	50.396			
F	<i>P. ursinus</i>	20.412	22.647	35.467	38.757	42.139		
G	<i>T. gelada</i>	3785	3751	3780	3747	3801	3764	

		AB	C	D	E	F	G
		<i>P. anubis/P. cyno</i>	<i>P. hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>P. ursinus</i>	<i>T. gelada</i>
AB	<i>P. anubis/p. cyno</i>						
C	<i>P. hama</i>	23.5705					
D	<i>P. kindae</i>	25.037	49.972				
E	<i>P. papio</i>	30.3645	32.867	50.396			
F	<i>P. ursinus</i>	21.5295	35.467	38.757	42.139		
G	<i>P. gelada</i>	3768	3780	3747	3801	3764	

		ABF	C	D	E	G
		<i>P. anubis/cyno/ursinus</i>	<i>P. hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>T. gelada</i>
ABF	<i>P. anubis/cyno/ursinus</i>					
C	<i>P. hama</i>	27.536				
D	<i>P. kindae</i>	29.61033333	49.972			
E	<i>P. papio</i>	34.28933333	32.867	50.396		
G	<i>T. gelada</i>	3766.666667	3780	3747	3801	

		ABFC	D	E	G
		<i>P. anubis/cyno/ursinus/hama</i>	<i>P. kindae</i>	<i>P. papio</i>	<i>T. gelada</i>
ABFC	<i>P. anubis/cyno/ursinus/hama</i>				
D	<i>P. kindae</i>	34.70075			

E	<i>P. papio</i>	33.93375	50.396		
G	<i>T. gelada</i>	3770	3747	3801	

		ABFCE	D	G
		<i>P. anubis/ cyno/ ursinus/ hama</i>	<i>P. kindae</i>	<i>T. gelada</i>
ABFCE	<i>P. anubis/ cyno/ ursinus/ hama</i>			
D	<i>P. kindae</i>	37.8398		
G	<i>T. gelada</i>	3776.2	3747	

		ABFCED	G
		<i>P. anubis/ cyno/ ursinus/ hama</i>	<i>T. gelada</i>
ABFCED	<i>P. anubis/ cyno/ ursinus/ hama</i>		
G	<i>T. gelada</i>	3771.333333	

University of Cape Town

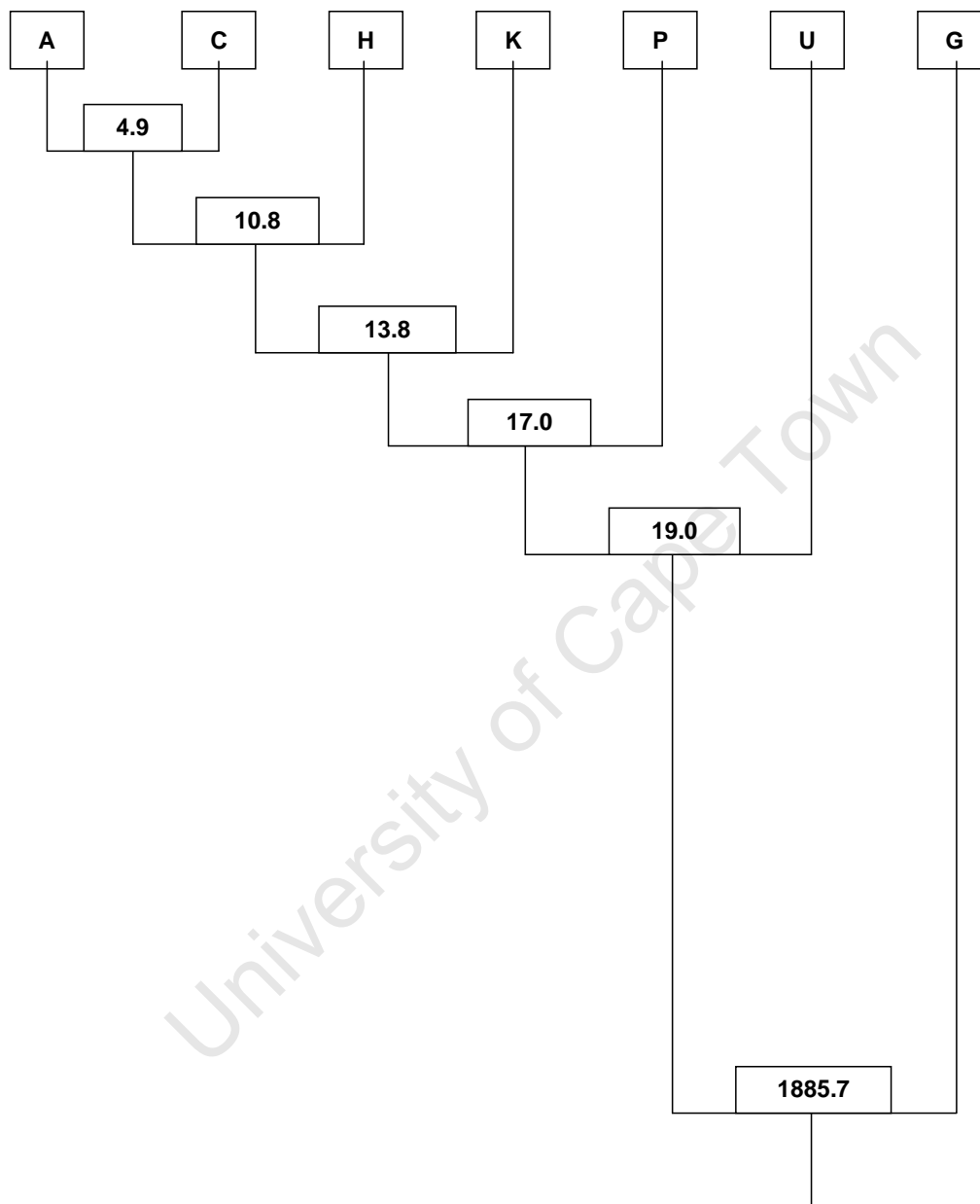


FIGURE 12. Diagram depicting UPGMA cluster analysis.

VARIATION BETWEEN INDIVIDUALS WITHIN SPECIES

The previous sections were devoted to considering variation between taxa. The primary goal of this section is to explore the within species variation through principal components and hierarchical cluster analysis.

Principal components and cluster analyses were run on three of the seven species (*P. anubis*, n=120; *P. cynocephalus*, n=123; *P. ursinus*, n=205). The four remaining species all have very small sample sizes (*P. kindae*, n=13; *P. papio*, n=12; *P. hamadryas*, n=25; *T. gelada*, n=11). A sample of 50 cases is often considered a minimum for principal components analysis (Comrey & Lee, 1992). In addition, it would be potentially hazardous to interpret the results of an exploratory analysis with such a small sample size. For these reasons, PCA and subsequent cluster analyses were not conducted on these species.

Results for *Papio anubis*

Table 13 displays the first three principal components for *P. anubis* (n=120). As with the analysis on the entire sample, two components do a sufficient job accounting for variance in the data structure (64.31%). The third component explains only a small proportion of the variance, therefore only the first two components are examined visually (Figure 13). There is no clear clustering in the data.

TABLE 13. *P. anubis* – First three principal components

Component	Total	% Variance	Cumulative %
1	23.603	50.218	50.218
2	6.625	14.096	64.314
3	2.009	4.274	68.589

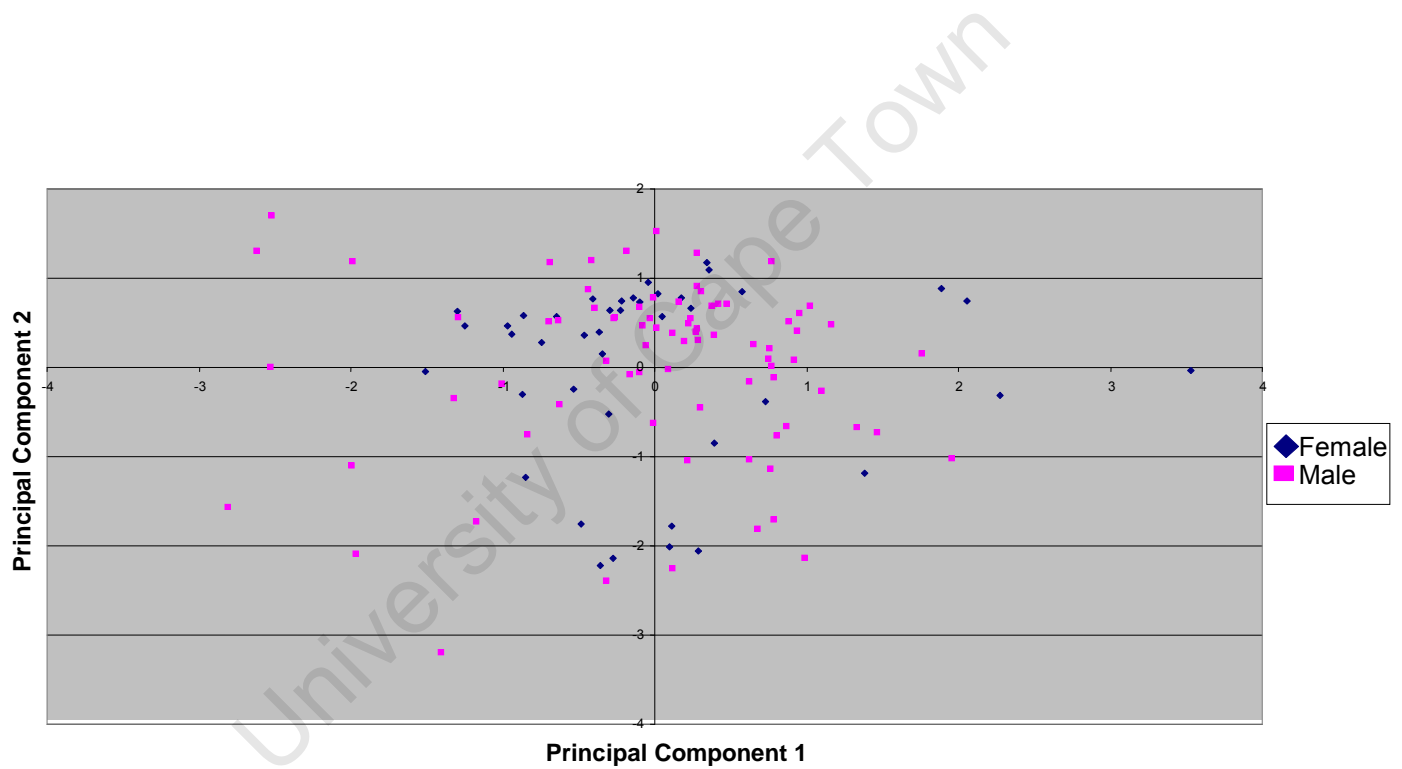


FIGURE 13. *P. anubis* specimens separated by sex.

Results for *Papio cynocephalus*

Table 14 displays the first four principal components for *P. cynocephalus* (n=123). Again, the first two components account for a substantial proportion of the variance in the data structure (57.54%), therefore only the first two components (Figure 14) are needed to reasonably represent the measurement data. Again, there is no evidence for distinct clustering.

TABLE 14. *P. cynocephalus* – First four principal components

Component	Total	% Variance	Cumulative %
1	17.864	38.008	38.008
2	9.182	19.536	57.544
3	2.329	4.955	62.499
4	2.118	4.507	67.006

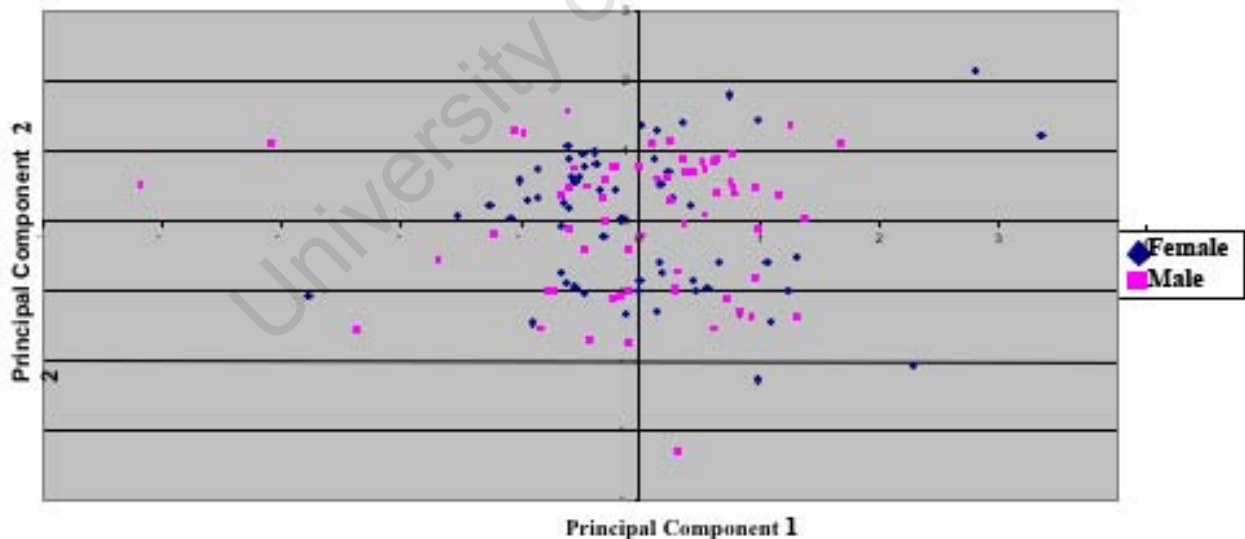


FIGURE 14. *P. cynocephalus* specimens separated by sex.

Results for *Papio ursinus*

Table 15 displays the first three principal components for *P. ursinus* (n=205). As with the previous two species, the first two components account for a substantial proportion of the variance in the data structure (62.23%) so only the first two components are presented. *P. ursinus* specimens clearly cluster into two distinct groups (Figure 15), however the division between these groups does not represent sexual dimorphism. Specifically, there appears to be two large data clusters differentiated primarily by PC 2 (i.e. the groups are spread apart on the PC 2 axis). There are also a handful of very distinctive males and females (left and right, respectively, of the main cluster on PC1; see also Figure 6). Table 16 displays the agglomeration coefficients for the last 6 clusters in the hierarchical cluster analysis. The first marked jump in the associated agglomeration coefficients occurs when combining four clusters into three. This is a signal that a four group clustering result may be a good stopping point, however there appear to be only two strong clusters, plus the handful of distinctive individuals discussed above.

TABLE 15. *P. ursinus* – First three principal components

Component	Total	% Variance	Cumulative %
1	18.220	38.765	38.765
2	11.030	23.468	62.233
3	1.656	3.524	65.757

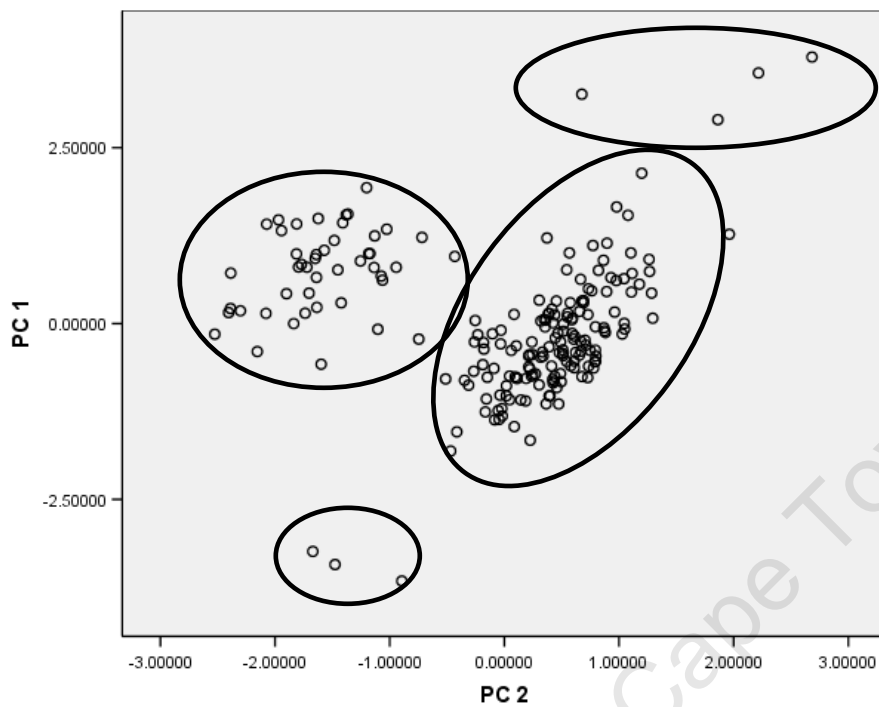


FIGURE 15. *P. ursinus* specimens plotted in the two-dimensional component space. Ovals indicate possible clusters identified in UPGMA cluster analysis.

TABLE 16. *P. ursinus* – Agglomeration coefficients for the last six cluster combinations.

No. of Groups	Agglomeration Coefficients
1	17.841
2	15.173
3	6.317
4	2.772
5	2.684
6	1.811

Since *P. ursinus* does not separate on the basis of sex, specimens were plotted on a map to determine whether these morphs map in some way to geographic distance. Figure 16 depicts the geographic locality of the two clusters present in PC 1 and 2. Red dots indicate the higher cluster and blue indicate the lower cluster. Although there are some regions that appear to be either ‚blue’ or ‚red’ dominated – such as those in the Western Cape (blue) or Ladysmith (red), there is no clear geographic division between these morphs.

University of Cape Town

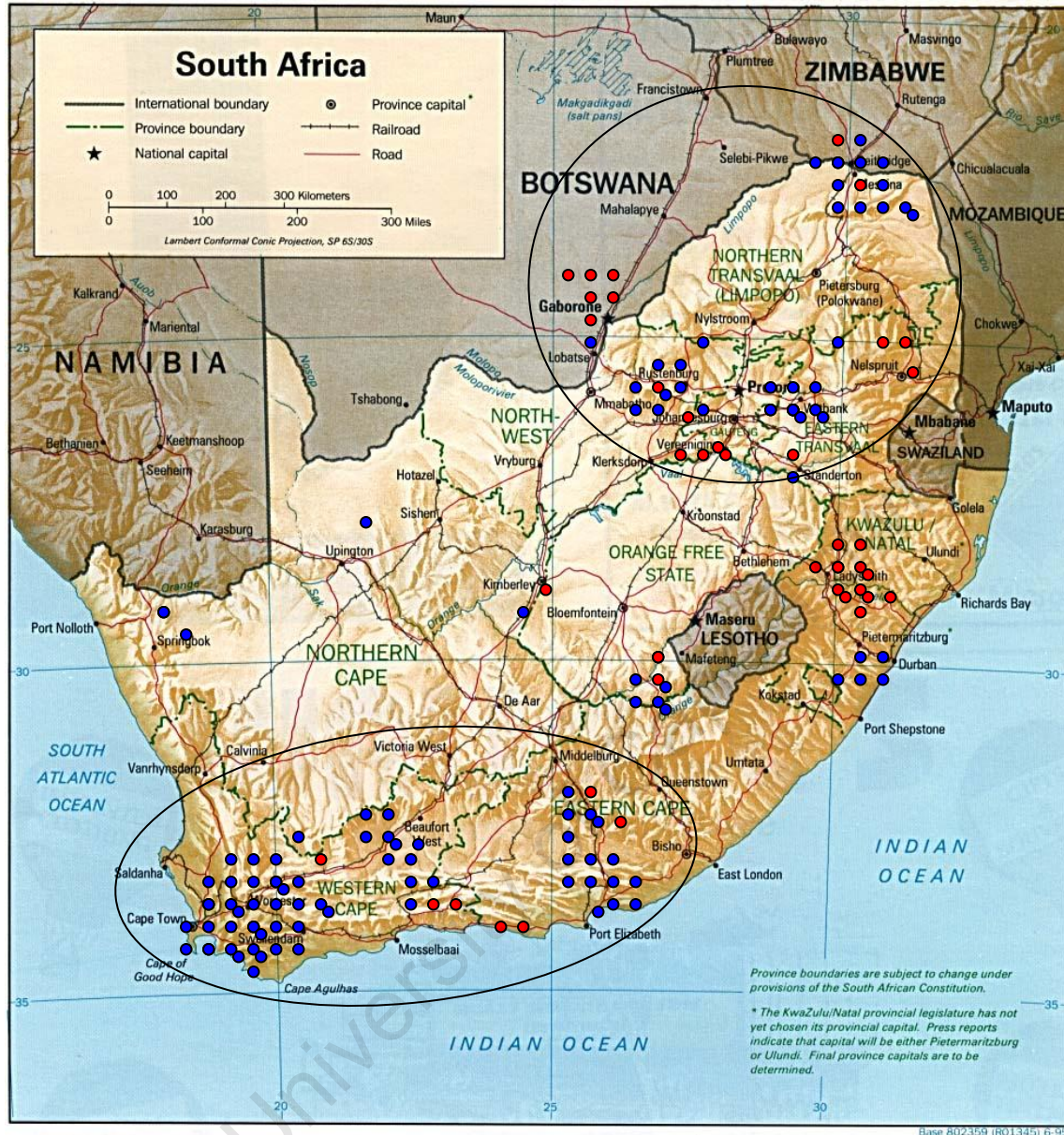


FIGURE 16. *P. ursinus* clusters plotted on map. Red dots indicate the higher cluster, blue dots indicate bottom cluster.

These results provide some evidence for two relatively distinct clusters of specimens (the two large clusters). Since the two small clusters contain only 3 and 4 specimens, respectively, it is difficult to tell if these are the result of random data fluctuations or legitimate data clusters. To further explore how the identified clusters differ in terms on the original measurement variables the structure of the principal components can be examined. Table 17 shows the rotated loadings (correlations) between each of the measurement variables and the two principal components. Large loadings indicate that a variable is highly related to a principal component (PC). The meaning of a particular PC can be conceptualized by looking at the set of variables that load highly on that PC. As noted above, scores on PC 2 differentiate the two major clusters in this species. To understand what this means in terms of the original measurement variables, the primary columns of interest are the first, which represent the individual variable and the PC 1 and the PC 2 columns. These represent the first two factors that were extracted. The value in each of the columns represents a factor loading which can be interpreted like a correlation coefficient. Values closer to 1 indicate a stronger relationship and vs. for lower values. Most of the items have a high degree of relationship with the overall factor. Values less than 0.45 are typically not retained because they do not add meaningful information to the factor (Kaiser-Guttman rule) and did not have a close enough relationships with each other to form another factor (Brown, 2006).

Table 18 also reveals relatively large dimensions for size associated with PC 1 ranging from 0.573 – 0.899. Table 17 also reveals a range in shape variation associated with PC 2 (-0.875 – 0.951) with lower values associated with the face and higher associated with the shape of the cranial vault.

TABLE 17. *P. ursinus*– Rotated Loading Matrix^a

Measurement	Functional Group	Region	PC 1	PC 2
6 BRE-L	Cranial Vault	Neurocranium	.849	
7 BRE-A	Cranial Vault	Neurocranium	.847	
8 NAS-RHI	Nasal	Face	.759	
10 NAS-FMO	Orbit	Face	.581	
12 RHI-ANS	Nasal	Face	.749	
13 RHI-ZYO	Nasal	Face	.860	
14 RHI-ZYM	Nasal/zygomatic	Face	.705	
18 ALV-PMM	Nasal/oral	Face	.627	
19 IPM-ZYO	Oral/zygomatic	Face	.899	
20 IPM-ZYM	Oral/zygomatic	Face	.824	
21 IPM-M ³	Oral	Face	.597	
22 PMM-FMT	Nasal	Face	.573	
32 IZT-M ³	Zygomatic/oral	Face	.875	
35 PMM-FTP	Nasal	Face	.676	
36 FTP-L	Cranial Vault	Neurocranium	.841	
37 FTP-A	Cranial Vault	Neurocranium	.875	
38 PET-POR	Cranial base	Neurocranium	.599	
39 PET-M ³	Cranial base/oral	Neurocranium	.877	
41 PMM-PET	Nasal/base	Face	.713	
42 PET-L	Cranial base/vault	Neurocranium	.865	
43 PMM-POR	Vault/nasal	Face	.739	
46 L-OPI	Cranial base/vault	Neurocranium	.869	
1 BRE-NAS	Cranial Vault	Neurocranium		.628
2 BRE-MTI	Orbit/cranial vault	Face		.618
4 BRE-POR	Cranial Vault	Neurocranium		.921
5 BRE-JUG	Cranial Vault	Neurocranium		.951
9 NAS-FMT	Orbit	Face		.859
11 NAS-FTP	Orbit/cranial Vault	Neurocranium		.827
15 ANS-ALV	Oral/nasal	Face		.763
16 ANS-IPM	Oral/nasal	Face		.603
23 FMT-MTI	Orbit	Face		-.596
24 NAS-FMO	Orbit	Face		-.875
27 FMO-MTI	Orbit	Face		.916
28 FMO-ZYO	Orbit/zygomatic	Face		-.582
29 ZYO-ZYM	Zygomatic	Face		.659
30 SZT-IZT	Zygomatic	Face		.680
31 IZT-FTP	Zygomatic/cranial vault	Neurocranium		.793
33 FTP-PET	Cranial vault	Neurocranium		.923
34 FTP-POR	Cranial Vault	Neurocranium		.763
45 L-A	Cranial vault	Neurocranium		.885
3 BRE-FTP	Cranial Vault	Neurocranium	-	-
17 ALV-IPM	Oral	Face	-	-
25 MTI-FMO	Orbit	Face	-	-
26 MTI-ZYO	Orbit	Face	-	-
40 PET-JUG	Cranial base	Neurocranium	-	-
44 IPM-L	Cranial vault/oral	Neurocranium/face	-	-
47 OPI-BAS	Cranial base	Neurocranium	-	-

^a Displayed are the correlations (loadings) between each measurement variable and the first two principal components. Correlations less than .45 are removed from the table to simplify interpretation. The principal component space was rotated using Varimax rotation.

MATRICES

Phenotypic covariance and correlation matrices were used to analyze between species variation. Matrices were calculated for each species. Matrices were also calculated separately for the females and males within each species to consider sex-related differences in patterns of variation. The *P. kindae*, *P. hamadryas*, *P. papio*, and *T. gelada* matrices were found to be overdetermined (i.e. some eigenvalues of the correlation and covariance matrices were negative), and were corrected by „bending’ the matrices (Hill & Thompson, 1978; Hayes & Hill, 1981; Jorjani et al., 2003). Additionally, the observed correlation and the adjusted correlation numbers are much lower than the maximum correlation numbers, because maximum correlation is a theoretically derived correlation used to adjust the observed correlation relative to the maximum possible; given things like small sample size, etc.

Correlation and covariance patterns between species (pooled sexes)

Table 18 shows the matrix correlation and random skewers vector correlation between species, including *T. gelada*. The repeatability of a measurement affects the ability to accurately ascertain its association with a specific outcome. Matrix repeatability for each species matrix is shown alongside the comparisons (t_1 and t_2 , respectively). All matrices are highly repeatable (0.81 – 0.98), limiting the impact of estimation error in this analysis. All matrix correlations (elementwise correlations between correlation matrices) and vector correlations (random skewer comparisons of covariance matrices) were significant at $P < 0.001$. Adjusted matrix correlations range from 0.14 to 0.82, with an average of 0.4, while adjusted vector correlation ranged from 0.15 to 0.92, with an average of 0.48. The lowest adjusted vector correlations occur between *P.*

anubis and *P. kindae* (0.152), *P. cynocephalus* and *P. kindae* (0.197), *P. ursinus* and *P. kindae* (0.104), *P. hamadryas* and *P. kindae* (0.227), and *P. hamadryas* and *T. gelada* (0.210) indicating dissimilarity of covariance matrix structure. Overall, *T. gelada*, *P. ursinus* and *P. kindae* have the lowest vector correlations between themselves and all other species. *T. gelada* has a range of 0.14-0.27 (an average of 0.21), *P. kindae* has a range of 0.10-0.65 (average of 0.26), and *P. ursinus* has a range of 0.22-0.47 (average of 0.34). The *T. gelada* data are not surprising given the generic distinction of this taxon relative to all other taxa within the genus *Papio*. *P. kindae* are also quite distinctive; this might be due to size-related shape differences in this species, as *P. kindae* baboons are the smallest of the taxa represented here. *P. ursinus* has the third lowest adjusted vector correlation at 0.34 likely due to the fact that it is the basal lineage. The highest matrix correlations are between *P. anubis* and *P. cynocephalus* to all other species (both average 0.5). These high correlations could be due to large sample sizes and, therefore, a higher sampling of the population. The high correlation may also be due to the close geographic and genetic proximity of the species, and possibly their known ability to hybridize.

TABLE 18. Matrix correlation and random skewers vector correlation between species.

Species 1	Species 2	Correlation Matrices					Covariance Matrices				
		<i>t</i> 1	<i>t</i> 2	Max corr	Obs corr	Adj corr	<i>t</i> 1	<i>t</i> 2	Max vector corr	Obs vector corr	Adj vector corr
Anubis	Cyno	0.916	0.969	0.942	0.769	0.816	0.936	0.993	0.964	0.883	0.916
Anubis	Kindae	0.916	0.802	0.857	0.599	0.699	0.936	0.933	0.964	0.147	0.152
Anubis	Hama	0.916	0.890	0.903	0.639	0.708	0.936	0.987	0.961	0.887	0.923
Anubis	Papio	0.916	0.813	0.862	0.211	0.245	0.936	0.927	0.931	0.655	0.704
Anubis	Ursinus	0.916	0.984	0.949	0.368	0.388	0.936	0.993	0.964	0.410	0.425
Anubis	Gelada	0.916	0.809	0.861	0.162	0.188	0.936	0.964	0.950	0.504	0.531
Cyno	Kindae	0.969	0.802	0.882	0.524	0.594	0.993	0.933	0.963	0.190	0.197
Cyno	Hama	0.969	0.890	0.929	0.513	0.552	0.993	0.987	0.990	0.822	0.830
Cyno	Papio	0.969	0.813	0.888	0.237	0.269	0.993	0.927	0.959	0.704	0.734
Cyno	Ursinus	0.969	0.984	0.976	0.427	0.438	0.993	0.993	0.993	0.417	0.420
Cyno	Gelada	0.969	0.809	0.885	0.211	0.238	0.993	0.964	0.978	0.502	0.513
Kindae	Hama	0.802	0.890	0.845	0.492	0.582	0.933	0.987	0.960	0.218	0.227
Kindae	Papio	0.802	0.813	0.807	0.494	0.612	0.933	0.927	0.930	0.608	0.654
Kindae	Ursinus	0.802	0.984	0.888	0.248	0.279	0.933	0.993	0.963	0.100	0.104
Kindae	Gelada	0.802	0.809	0.805	0.214	0.266	0.933	0.964	0.948	0.203	0.214
Hama	Papio	0.890	0.813	0.851	0.169	0.199	0.967	0.927	0.947	0.634	0.669
Hama	Ursinus	0.890	0.984	0.936	0.273	0.292	0.967	0.992	0.979	0.392	0.400
Hama	Gelada	0.890	0.809	0.849	0.117	0.138	0.967	0.964	0.965	0.203	0.210
Papio	Ursinus	0.813	0.984	0.984	0.463	0.470	0.927	0.992	0.959	0.317	0.331
Papio	Gelada	0.813	0.809	0.811	0.230	0.284	0.927	0.964	0.945	0.486	0.514
Ursinus	Gelada	0.984	0.809	0.893	0.203	0.227	0.992	0.964	0.978	0.314	0.321

Correlation and covariance patterns between females and males

Correlation and covariance patterns were also compared between species to see if there was more or less variation present between than within the sexes. This time separating the analyses by sex, Table 19 shows matrix correlation and random skewers results for the females, and Table 20 for the males, across all species. Again, repeatabilities are very high, limiting the impact of estimation error. Various species whose N is too low to create a correlation and/or covariance matrix (*P. hamadryas*, *P. papio*, and *T. gelada* females) are left out.

Two patterns emerge in the analyses of females. First, there is a close relationship between the patterns of correlation/covariance among *P. cynocephalus*, *P. anubis* and *P. ursinus*. Although *P. cynocephalus* and *P. anubis* are closely related, as the stem species *P. ursinus* is not expected to cluster with the others. This suggests that these correlations may reflect the geographic proximity of the species, and possibly the presence of shared migrants between them. The second pattern to emerge from the analysis is that *P. kindae* females are the least similar to the other taxa overall, in terms of their morphological patterning. Again, this supports the notion that *P. kindae* and *P. cynocephalus* represent different species.

Comparisons of males between each species reveal a similar pattern. Average correlations range from 0.35-0.59. The lowest average correlation was between *P. kindae* and the rest of the species (0.35), while the highest was between *P. cynocephalus* and the rest of the species (0.59). As with the females, the low correlations between *P. kindae* and the rest of the species support the idea that *P. kindae* is a distinct species. Similarly to the female analysis, *P. anubis* and *P. cynocephalus* males have high correlations as do *P. ursinus* and *P. cynocephalus*

males. Again, the close correlation between *P. anubis* and *P. cynocephalus* may reflect geographic proximity and their known ability to hybridize.

University of Cape Town

TABLE 19. Matrix correlation and random skewers vector correlation between females of each species. Species whose sample size was too low to perform analysis are left out.

Species 1	Species 2	Correlation Matrices					Covariance Matrices				
		<i>t</i> 1	<i>t</i> 2	Max corr	Ob corr	Adjust corr	<i>t</i> 1	<i>t</i> 2	Max vector corr	Observe vector corr	Adjust vector corr
Anubis	Cyno	0.943	0.729	0.829	0.773	0.932	0.995	0.964	0.979	0.855	0.873
Anubis	Kindae	0.943	0.732	0.831	0.502	0.604	0.995	0.732	0.853	0.583	0.683
Anubis	Ursinus	0.943	0.972	0.957	0.753	0.787	0.995	0.985	0.990	0.579	0.585
Cyno	Kindae	0.729	0.732	0.73	0.354	0.485	0.964	0.732	0.840	0.562	0.669
Cyno	Ursinus	0.729	0.972	0.842	0.870	0.998	0.964	0.985	0.974	0.588	0.604
Kindae	Ursinus	0.732	0.972	0.844	0.403	0.478	0.732	0.985	0.849	0.347	0.409

TABLE 20. Matrix correlation and random skewers vector correlation between males of each species.

Species 1	Species 2	Correlation Matrices					Covariance Matrices				
		<i>t</i> 1	<i>t</i> 2	Maximum correlation	Observed correlation	Adjusted correlation	<i>t</i> 1	<i>t</i> 2	Maximum vector correlation	Observed vector correlation	Adjusted vector correlation
Anubis	Cyno	0.960	0.941	0.950	0.682	0.718	0.998	0.992	0.995	0.851	0.855
Anubis	Kindae	0.960	0.679	0.807	0.417	0.517	0.998	0.796	0.891	0.662	0.743
Anubis	Hama	0.960	0.892	0.925	0.664	0.718	0.998	0.986	0.992	0.872	0.879
Anubis	Papio	0.960	0.814	0.884	0.355	0.402	0.998	0.932	0.964	0.651	0.675
Anubis	Ursinus	0.960	0.969	0.964	0.602	0.624	0.998	0.996	0.997	0.865	0.868
Anubis	Gelada	0.960	0.796	0.874	0.273	0.312	0.998	0.945	0.971	0.418	0.430
Cyno	Kindae	0.941	0.679	0.799	0.419	0.524	0.992	0.796	0.889	0.776	0.873
Cyno	Hama	0.941	0.892	0.916	0.508	0.555	0.992	0.986	0.989	0.807	0.816
Cyno	Papio	0.941	0.814	0.875	0.425	0.486	0.992	0.932	0.962	0.716	0.744
Cyno	Ursinus	0.941	0.969	0.955	0.838	0.877	0.992	0.996	0.994	0.879	0.884
Cyno	Gelada	0.941	0.796	0.865	0.317	0.366	0.992	0.945	0.968	0.457	0.472
Kindae	Hama	0.679	0.892	0.778	0.446	0.573	0.796	0.986	0.889	0.598	0.673
Kindae	Papio	0.679	0.814	0.743	0.134	0.180	0.796	0.932	0.861	0.548	0.636
Kindae	Ursinus	0.679	0.969	0.811	0.333	0.411	0.796	0.996	0.890	0.618	0.694
Kindae	Gelada	0.679	0.796	0.735	0.117	0.159	0.796	0.945	0.867	0.310	0.358
Hama	Papio	0.892	0.814	0.852	0.274	0.322	0.986	0.932	0.959	0.638	0.665
Hama	Ursinus	0.892	0.969	0.930	0.445	0.478	0.986	0.996	0.991	0.844	0.852
Hama	Gelada	0.892	0.796	0.843	0.204	0.242	0.986	0.945	0.965	0.382	0.396
Papio	Ursinus	0.814	0.969	0.888	0.422	0.475	0.932	0.996	0.963	0.717	0.745
Papio	Gelada	0.814	0.796	0.805	0.160	0.199	0.932	0.945	0.938	0.392	0.418
Ursinus	Gelada	0.969	0.796	0.878	0.379	0.432	0.996	0.945	0.970	0.442	0.456

PATTERNS OF ALLOMETRY

The overall baboon allometry pattern is positively allometric for calvarium height and midface and palate length and negatively allometric for cranial base length. This indicates that positive growth in the midface at the expense of relatively reduced cranial base length. The allometry vectors of *Papio plus Theropithecus*, all *Papio*, and of each of the species are shown in Table 21 to illustrate differences between them. Note that the allometry vector of the *Papio/Theropithecus* group and the all *Papio* group is not that different. Overall, most *Papio* species share the same pattern of positive allometry. However, *P. papio* is negatively allometric for facial length and slightly positively allometric for calvarium height. The pattern for *P. papio* appears to be slightly different from the rest of *Papio*.

Table 22 shows the angles between the vectors along with the correlation between the two vectors for each of these calculations. The most similar allometry vectors are those of *P. kindae* and *P. anubis* baboons, as they have the smallest angle between them at 11.52° and have the highest correlation between them (0.98). *P. cynocephalus* and *P. anubis* also have small angles between them (13.34°) and a high correlation value (0.97). The most different allometry vectors are those of *P. ursinus* and *T. gelada* as they have the widest angle between them (76.23°) and the lowest correlation (0.24).

TABLE 21. Allometry vectors of within-group covariances ¹

TRAIT	All								
	All N=664	Papio N=646	Anubis N=189	Cyno N=143	Hama N=29	Kindae N=41	Papio N=23	Ursinus N=221	Gelada N=18
BRE-NAS	0.37	0.38	0.3	0.16	0.25	0.24	-0.33	0.22	0.49
BRE-MTI	0.38	0.41	0.33	0.16	0.27	0.25	-0.36	0.15	0.53
BRE-FTP	0.08	0.05	-0.08	0.01	0.04	-0.04	-0.18	0.15	0.28
BRE-POR	0.41	0.41	0.35	0.16	0.12	0.41	-0.14	0.25	0.13
BRE-JUG	0.39	0.4	0.08	0.08	-0.04	0.35	-0.06	0.23	0.08
BRE-L	2.66	2.68	2.65	1.59	1.36	1.74	1.34	1.65	1.65
BRE-A	2.27	2.32	2.31	1.5	1.43	1.52	1.45	1.29	1.71
NAS-RHI	1.56	1.48	1.43	0.89	0.7	0.71	0.42	1.23	0.31
NAS-FMT	0.2	0.19	0.06	0.07	-0.13	0.05	0.09	0.16	0.02
NASFMO	0.34	0.31	0.33	0.15	0.21	0.16	0.06	0.3	0.13
NAS-FTP	0.47	0.45	0.24	0.12	0.04	0.23	-0.09	0.4	0.15
RHI-ANS	0.58	0.58	0.44	0.3	0.2	0.17	0.26	0.38	0.31
RHI-ZYO	1.32	1.22	1.21	0.73	0.55	0.78	0.47	1.16	0.19
RHI-ZYM	0.76	0.71	0.88	0.43	0.33	0.6	0.05	0.64	0.09
ANS-ALV	0.35	0.39	0.25	0.34	-0.01	0.33	-0.11	0.1	0.2
ANS-IPM	0.22	0.22	0.09	0.28	0.07	0.14	-0.03	0.14	0.14
ALV-IPM	0.28	0.24	0.14	0.28	0.08	0.19	0.09	0.31	0.14
ALV-PMM	1.23	1.09	0.93	0.71	0.35	0.71	-0.38	1.32	-0.68
IPM-ZYO	2.01	1.99	1.57	1.29	0.69	1.04	0.42	1.39	0.51
IPM-ZYM	1.38	1.41	1.24	0.84	0.47	0.8	0.21	0.8	0.47
PMM-M3	0.84	0.86	0.87	0.42	0.46	0.45	-0.21	0.48	0.45
PMM-FMT	1.12	1.22	0.97	0.75	0.4	0.54	1.02	0.37	1.43
FMT-MTI	0.13	0.14	0.18	0.05	0.04	0.05	0.16	0.08	0.06
NASFMO	0.21	0.19	0.37	0.1	0.32	0.19	0	0.16	0.11
MTI-FMO	0.19	0.17	0.2	0.1	0.11	0.04	-0.08	0.19	0.04
MTI-ZYO	1.89	1.9	0.21	0.05	0.04	0.05	0.22	2.77	0.08
FMO-MTI	0.15	0.13	0.05	0.05	0.08	0.12	-0.29	0.15	-0.09
FMOZYO	0.16	0.16	0.23	0.1	0.09	0.16	-0.05	0.09	0.05
ZYOZYM	0.5	0.5	0.37	0.32	0.2	0.3	-0.3	0.36	0.02
SZT-IZT	0.24	0.26	0.17	0.17	-0.06	0.17	-0.08	0.11	-0.02
IZT-FTP	0.6	0.63	0.72	0.27	0.27	0.58	-0.02	0.26	0.22
IZT-M3	0.96	1.01	0.93	0.71	0.16	0.72	0.6	0.46	0.47
FTP-PET	0.41	0.41	0.39	0.2	0.25	0.33	0.06	0.24	0.11
FTP-POR	0.35	0.36	0.45	0.28	0.44	0.3	0.05	0.16	0.29
PMM-FTP	1.32	1.37	1.24	0.78	0.44	0.8	0.84	0.65	1.39
FTP-L	2.49	2.49	2.47	1.56	0.54	1.7	1.52	1.65	1.04
FTP-A	2.14	2.19	2.22	1.56	0.6	1.52	1.66	1.27	1.17
PET-POR	0.32	0.33	0.46	0.21	0.32	0.35	0.02	0.18	0.17
PET-M3	1.15	1.19	1.04	0.73	0.41	0.83	0.8	0.63	0.24
PET-JUG	0.04	0.03	0.1	0.05	-0.07	0.04	-0.08	0.04	0.15
PMMPET	1.14	1.2	1.21	0.68	0.57	0.66	0.77	0.49	1.2
PET-L	2.2	2.22	2.2	1.62	0.33	1.52	1.47	1.44	0.78
PMMPOR	1.42	1.48	1.58	0.91	0.9	0.94	0.82	0.64	1.45
IPM-L	-0.36	0.13	0.18	1.01	-0.44	-0.65	0.98	-1.84	1.36
L-A	0.63	0.47	0.45	0.08	-0.06	0.35	-0.08	0.89	0.52
L-OPI	3.24	2.5	2.6	1.7	0.55	1.71	1.31	4.67	0.07
OPI-BAS	-0.81	0.16	0.16	0.01	0.1	0.08	-0.09	-3.6	1.03

¹ Standardized first principal component for all baboons was converted (divided by $(1/\sqrt{47})$) to identify regions where variables diverge from isometry. Variables greater or less than 1.0 are positively or negatively allometric, respectively.

TABLE 22. Angles between allometry vectors and associated correlation values (shown in parentheses) for each pairwise species comparison.

	Anubis	Cyno	Hama	Kindae	Papio	Ursinus	Gelada
Anubis	0° (1)						
Cyno	13.34° (0.97)	0° (1)					
Hama	26.16° (0.90)	34.04° (0.83)	0° (1)				
Kindae	11.52° (0.98)	21.28° (0.93)	27.23° (0.89)	0° (1)			
Papio	31.10° (0.86)	27.86° (0.88)	46.45° (0.69)	36.92° (0.80)	0° (1)		
Ursinus	45.32° (0.70)	49.50° (0.65)	53.28° (0.60)	43.42° (0.73)	57.33° (0.54)	0° (1)	
Gelada	40.66° (0.76)	39.52° (0.77)	43.02° (0.73)	46.57° (0.69)	38.03° (0.79)	76.26° (0.24)	0° (1)

University of Cape Town

MORPHOLOGICAL INTEGRATION

The morphological integration results are presented in Table 23. In *Papio*, connectivity matrices were designed to assess morphological integration within six regions of the face – base, vault, oral, nasal, zygomatic, orbit and within the face as a whole. *P. papio*, *P. cynocephalus*, and *P. hamadryas* show a similarly higher level of total morphological integration as indicated by the correlation values for the total integration matrix. Primary contributions to morphological integration in the baboon cranium come from the nasal, oral, and zygomatic regions and to a lesser extent the orbit, base and vault regions. Overall, the nasal region is the most highly integrated and the orbital region the least integrated. Otherwise, small differences emerge among the species. *P. papio* is the most highly integrated overall followed by *P. cynocephalus* and *P. hamadryas*, while *T. gelada* is the least integrated in total morphological integration with zygomatic and orbital regions being the least integrated.

Studies across New World monkeys and Old World monkeys indicate that baboons have very similar patterns of morphological integration. New World monkeys share a basic pattern of morphological integration across the whole cranium with a strong correlation of oral traits. Generally, correlation among facial traits is generally stronger than among neurocranial traits. Overall, the most highly integrated trait set is the set of oral traits, while the cranial base, nasal region, zygomatic region, and orbital region are the least highly integrated (Ackermann & Cheverud, 2004).

Baboons share a common pattern of variation/covariation and integration and fit the typical pattern of primate integration. Cranial integration for *Papio* and *Theropithecus* can be summarized as follows: a high degree of total integration throughout the entire cranium, with primarily contributions by the nasal and oral units. The results presented in this thesis indicate that baboons fit the pattern of morphological integration seen in other extant primates.

TABLE 23. Morphological integration for *Papio* and *T. gelada*.

	N	Vt	Total MI	Adj TMI	P	Avg (+)	Avg (-)	Zyg MI	P	Avg (+)	Avg (-)	Orbit MI	P	Avg (+)	Avg (-)
<i>P. Anubis</i>	120	0.008	0.008	0.091	0.037	0.459	0.424	0.008	0.116	0.593	0.399	-0.122	0.966	0.202	0.441
<i>P. cynocephalus</i>	123	0.009	0.152	0.171	0.001	0.284	0.281	0.007	0.110	0.399	0.267	-0.156	0.999	0.293	0.122
<i>P. kindae</i>	13	0.109	0.038	0.052	0.174	0.245	0.223	0.019	0.336	0.369	0.237	-0.109	0.985	0.190	0.255
<i>P. hamadryas</i>	25	0.103	0.114	0.135	0.010	0.377	0.384	0.112	0.043	0.370	0.687	-0.135	0.961	0.408	0.254
<i>P. papio</i>	11	0.101	0.171	0.190	0.001	0.075	0.041	0.006	0.118	0.033	0.085	-0.163	0.792	0.054	0.076
<i>P. ursinus</i>	205	0.173	0.008	0.010	0.160	0.297	0.299	0.004	0.355	0.498	0.287	-0.003	0.798	0.106	0.315
<i>T. gelada</i>	11	0.134	0.007	0.090	0.049	0.321	0.267	-0.002	0.639	0.373	0.288	-0.127	0.992	0.073	0.307

	Oral MI	P	Avg (+)	Avg (-)	Nasal MI	P	Avg (+)	Avg (-)	Base MI	P	Avg (+)	Avg (-)	Vault MI	P	Avg (+)
<i>P. Anubis</i>	0.007	0.163	0.621	0.422	0.127	0.043	0.843	0.433	0.003	0.464	0.451	0.441	0.006	0.232	0.637
<i>P. cynocephalus</i>	0.17	0.002	0.452	0.287	0.118	0.002	0.485	0.285	0.006	0.427	0.325	0.292	0.009	0.102	0.357
<i>P. kindae</i>	0.002	0.344	0.380	0.218	0.115	0.037	0.251	0.389	0.009	0.403	0.258	0.247	0.007	0.166	0.374
<i>P. hamadryas</i>	0.141	0.017	0.412	0.703	0.133	0.041	0.409	0.406	-0.005	0.747	0.328	0.415	0.008	0.195	0.380
<i>P. papio</i>	0.143	0.005	0.228	0.061	0.138	0.010	0.103	0.069	0.004	0.215	0.087	0.088	0.111	0.043	0.220
<i>P. ursinus</i>	0.002	0.201	0.603	0.300	0.081	0.038	0.410	0.307	0.025	0.187	0.397	0.302	0.008	0.038	0.401
<i>T. gelada</i>	0.004	0.246	0.397	0.330	0.006	0.129	0.405	0.295	0.005	0.156	0.456	0.288	0.069	0.143	0.488

EVOLUTIONARY DIVERSIFICATION: DETERMINING THE ROLE OF GENETIC DRIFT

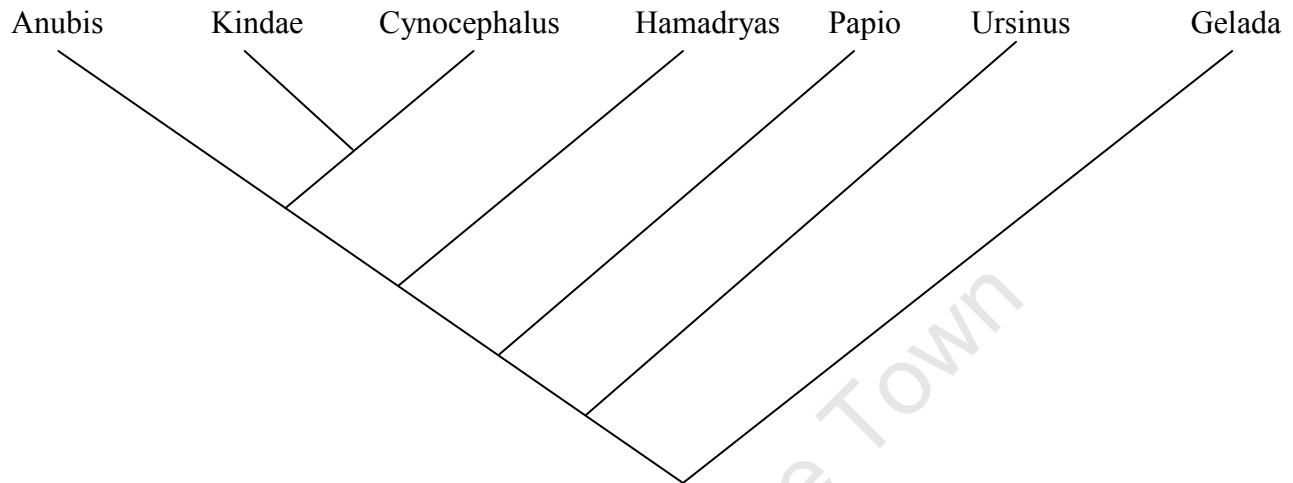


FIGURE 17. Phylogeny of the relationships between *Papio* and *Theropithecus*, based on simplified mtDNA cladogram of Newman et al. (2004) and used for constructing analyses. Not based on actual distances.

The test for genetic drift versus selection was performed at different levels in the baboon hierarchy (Table 24). First the analysis was performed on all of *Papio* and *Theropithecus* (Group 1). Then, *Theropithecus* was left out and the analysis was done solely among members of the genus *Papio* (Group 2) (see below). Analysis was also performed on *Papio* excluding *P. kindae* since the latter have proved to be different in most analyses. In the first analysis, with all specimens considered together, the results reveal a slope significantly different than one, and therefore divergence within these groups is unlikely to be due to genetic drift alone. For a group to be consistent with drift the 95% confidence interval must include 1. When *Theropithecus* is removed and only *Papio* is considered, the result is the same. When *P. kindae* is separated from the rest of

Papio, only then is this group consistent with drift (Table 25). This suggests that natural selection is acting to differentiate the smaller-bodied *P. kindae*.

It is feasible to discern possible reasons for deviations from a slope of 1.00 from examination of the regression residuals. For example, if the first variable is below the regression line, as seen in the analysis with all baboons plus the gelada, this indicates that for PC 1 the variation between populations is less than expected, given the variation within populations. Since the first principal component generally represents size, this would suggest that the groups are less different from each other in size than expected. In the analysis of *Papio* alone, this shifts, with the amount of variation among groups for the first few PCs exceeding expectations given the variation between groups. This suggests that there is more size variation within this sample than is expected under a model of drift. However, once *P. kindae* is removed from this analysis, the variation in the other taxa of the genus *Papio* can be explained by drift alone. This can be seen from the regression graphs (Figures 18-20). As *P. kindae* is removed, the data become more linear indicating consistency with genetic drift.

TABLE 24. Groupings for the test of selection versus genetic drift.

Group 1:	All <i>Papio</i> and <i>Theropithecus</i>
Group 2:	Only <i>Papio</i>
Group 3:	<i>Papio</i> without <i>P. kindae</i>

TABLE 25. Results of regression of between- and with-in group variance for within-group principal components and between group correlations among with-in group principal components as a test for genetic drift.

Group	Consistent with drift	Slope	95% confidence	R ²
All baboons w/gelada	No	0.66	0.49 <> 0.83	0.58
Only Papio	No	1.21	1.1 <> 1.32	0.92
Papio w/out <i>P. kindae</i>	Yes	1.13	0.98 <> 1.28	0.83

University of Cape Town

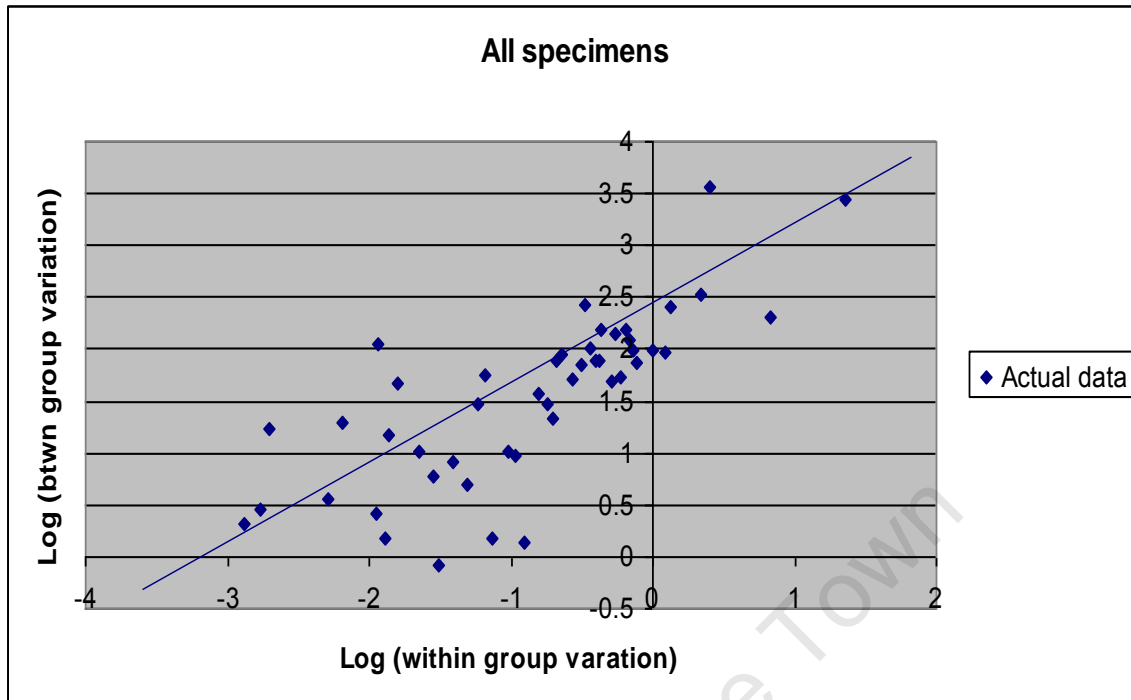


FIGURE 18. Graph of regression for the test of genetic drift with all specimens.

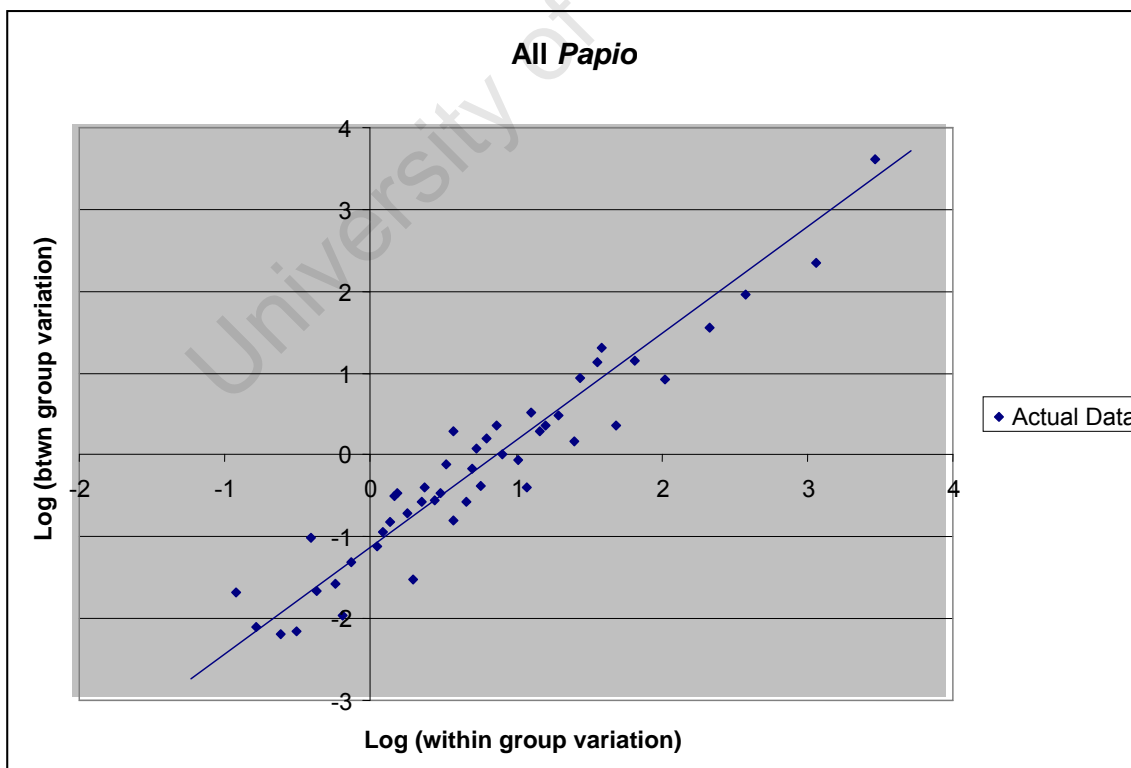


FIGURE 19. Graph of regression for the test of genetic drift with *Papio* only.

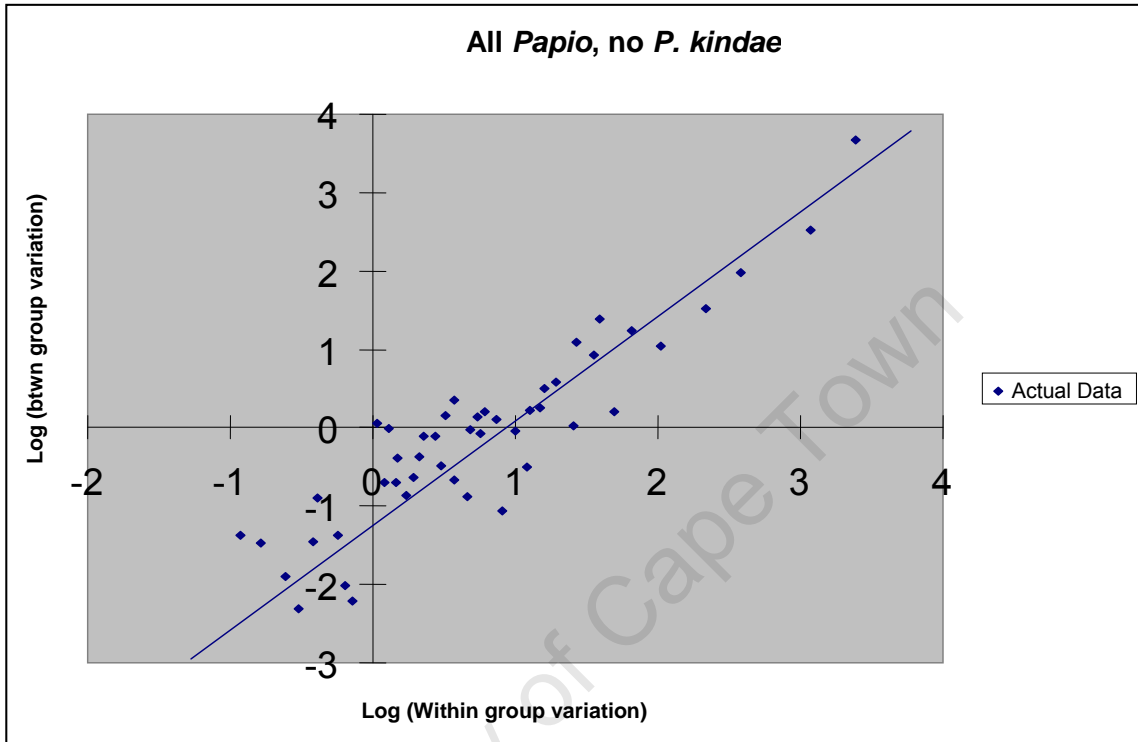


FIGURE 20. Graph of regression for the test of genetic drift with *Papio* without *P. kindae*.

CHAPTER 5: DISCUSSION AND CONCLUSIONS

Extant baboons of Africa have long played an important role in discussions of the phylogeny, classification, and morphology of primates. Their particular combination of behavioural, morphological, and ecological traits have shown them as highly variable primates, and have resulted in many discussions of the role that these variables play in determining species boundaries (Jolly, 1993; Fleagle, 1999). Whether they are classified as one species or separate species, there is general agreement that their physical and behavioural complexity, along with their ability to hybridize, are some of the most fascinating aspects of the genus *Papio* (Jolly, 1993; Groves, 2001; Kamilar, 2006; Burrell, 2008). This fascination is further heightened by the possibility that extant *Papio* may make a good model for early hominids (Washburn & DeVore, 1961; Delson, 1978; Strum & Mitchell, 1987; Jolly, 1993).

Jolly (1993) talks about a “good species” and the “species problem”. The aim of this project was to investigate three questions to address these issues, to better understand baboon morphological diversity, and to contribute to our understanding of baboon systematics. First, the research set out to quantitatively assess craniofacial variation within and between species of baboons (*Papio*) and geladas (*Theropithecus*). This is important as this demonstrates how different baboons species are, and adds valuable information to the ongoing discussion about phylogenetic relationships as well as the “species problem” in baboons. Second, morphological integration within the cranium was examined in order to see whether baboons fit the primate pattern of integration. Morphological integration plays an important role in directing evolutionary change, and

an understanding of baboon cranial integration is essential for more nuanced understanding of how natural selection may have acted to produce such integrated phenotypes (Ackerman & Cheverud, 2004). Third, this research tested whether genetic drift could have been responsible for producing the cranial diversity seen in these Old World primates. Again, this allows for a deeper understanding of the evolutionary processes responsible for driving evolutionary diversity. These three goals were pursued using morphometric multivariate analyses, and this chapter summarizes the results in terms of their bearings on these goals.

BETWEEN SPECIES VARIATION

Despite the ongoing taxonomic debate around whether *Papio* should be one or many species, there is considerable evidence that these taxa are genetically and morphologically distinct. Rogers (2000) provides genetic evidence for the separation of species stating that allele frequencies for protein polymorphisms differ significantly between subspecies of *P. hamadryas anubis*. Kamilar (2006), using discriminate function analysis, confirmed that *Papio* species inhabit significantly different habitats and that baboon ecology followed a longitudinal cline. Additionally, Jolly (1993) states that the five “forms” are phenotypically distinct and have some (but not all) of the attributes used to define one or another form of the species concept. Work by Newman et al. (2004) shows that the taxa are distinct in terms of their mitochondrial DNA, and furthermore provides evidence that this lineage is deep, with the first split between *P. ursinus* and all other *Papio* occurring at roughly 1.8 Ma.

When examining the results of the PCA, there is considerable overlap in cranial variation for many of the species. Nonetheless, some differences exist. Overall, when considering the first two components, which represent overall cranial vault elongation, there is a separation of *P. kindae*, and to a lesser extent *P. papio*, *P. hamadryas*, and *T. gelada* from the other taxa. The separation of *P. kindae* is not unexpected given their small size. The overlap of *P. anubis*, *P. cynocephalus*, and *P. ursinus* may not be surprising given the close proximity and overall similarity of these species. Additionally, *P. ursinus* and to a lesser extent *P. cynocephalus* separate into two clusters along PC2, which are not clearly linked to either sexual dimorphism or geographic distribution. Results indicate that the most divergent species is *P. kindae*. The distinctiveness of *P. kindae* is not surprising given the small size of *P. kindae* baboons, and what is a probably size-related shape difference in this taxon. However, it is surprising that *P. kindae* separates from the (olive + yellow + chacma) group even more than *T. gelada*.

The third and fourth components separate *T. gelada* from all other baboons, and to a lesser extent distinguish *P. kindae* and *P. ursinus* from the other taxa within the genus *Papio*. In particular, the most positive values on PC 3 represent crania from *T. gelada*, which exhibit increased cranial vault height compared to the other *Papio* species. There is also a slight separation of *P. kindae*, indicating that *P. kindae* crania exhibit a decreased cranial vault height. Again, this might be related to the small size (and differences in size-related shape) of this species. For PC 4, there is some separation of *P. kindae* and *P. ursinus* from the rest of the group.

Overall, the results of the PCA indicate a clear separation of *P. kindae* from the rest of *Papio* and from *Theropithecus*. Principal components 1 through 4 indicate that *P.*

kindae have relatively shorter, smaller crania. Additionally, the descriptive statistics from D^2 distances reveal a small mean for *P. kindae*, but also reveal a very small range of variation. This small range could be due in part to a small sample size for the species.

The PCA, and especially the CVA, results also show that *T. gelada* is morphologically distinct from the other species. Such results are expected, since this genus was included in this study as an outgroup, and they are also supported by the very large D^2 distance from the other species. Among the other taxa, results of the Mahalanobis distance analyses indicate that *P. anubis* and *P. cynocephalus* are most similar. This is consistent with their known genetic (Newman et al., 2004) and geographic proximity.

Turning to the matrix analyses, both matrix correlations and vector correlations are strong between each of the species. Adjusted matrix correlations range from 0.14 to 0.82, with an average of 0.4, while adjusted vector correlation ranged from 0.15 to 0.92, with an average of 0.48. The lowest adjusted vector correlations occur between *P. ursinus* and *P. kindae* (0.28), and *P. kindae* and *T. gelada* (0.27) indicating dissimilarity of covariance matrix structure between the *P. kindae* baboon and all other taxa. Matrix correlations analysis reveals a similar result to that seen in the principal component analysis with matrix correlations between the correlation matrices of each species found to be significant. The highest adjusted matrix correlations occur between *P. anubis* and *P. cynocephalus* (0.92) and *P. anubis* and *P. hamadryas* (0.92). One of the essential points concluded from this part of the analyses is that *P. kindae* has a low adjusted matrix correlation with all species indicating the most dissimilarity, again supporting the taxonomic distinction of *P. kindae*.

When allometry is looked at, *P. kindae* and *P. anubis* baboons have the most similar allometry vectors and the smallest angle between them, followed by *P. cynocephalus* and *P. anubis*. Similarities between the latter could reflect geographic proximity and the fact that *P. cynocephalus* and *P. anubis* are known to hybridize. However, in all other analyses *P. kindae* has been shown to be quite distinctive. The similarity allometry vectors between *P. kindae* and *P. anubis* is therefore surprising, and is something that should be looked into further in future studies. It is important to note, however, that *P. kindae* is also geographically close to *P. anubis*, so again proximity (and potentially gene flow) might underlie some aspect of allometric similarity.

WITHIN SPECIES VARIATION

The primary goal of these analyses was to explore the within species variation through principal components and hierarchical cluster analysis. Principal components and cluster analyses were run on three (*P. anubis*, *P. cynocephalus*, and *P. ursinus*) of the seven species. The four remaining species (*P. kindae*, *P. hamadryas*, *P. papio*, and *T. gelada*) all have very small sample sizes so a PCA could not be done. The three analyzed species displayed somewhat different results. Each taxon of baboon is highly variable. *P. anubis* and *P. cynocephalus* showed no strong clusters in the PC graphs. For *P. ursinus*, however, there were two (and possibly more) distinct clusters. PC 1 and 2 accounted for 62% of the variability within the sample. In this case, however, *P. ursinus* showed strong clustering.

Mahalanobis distances and subsequent UPGMA and MST are consistent with the cladistic arrangement proposed by Newman et al. (2004). While focusing on the mitochondrial origin of baboons and their genetic relationships, Newman et al. (2004) state that all definable allotaxa should be recognized either as phylogenetic species or as biological subspecies. This analysis and the analysis by Newman et al. (2004) both show that each baboon species is distinct.

Summary of Results for Hypothesis 1:

Ultimately, this study contributes to our understanding of variability in *Papio* (Hypothesis 1) in the following ways: Morphological differences between baboon species are significant. The current morphological evidence suggests that there are significant distinctions between the five recognized *Papio* taxa, as well as *P. kindae*. Although the ability to compare within-taxon variation was limited by sample size, this assessment of the degree of variation between the species sheds light on the current confusion regarding baboon taxonomy; each form, including *P. kindae*, should be considered a full species. The presence of high levels of variation and distinct clusters that are not sex-related in some species (i.e. *P. ursinus*) might be evidence for distinct lineages in this taxon or possibly gene flow (hybridization) from other taxa.

MORPHOLOGICAL INTEGRATION

In 1958, Olson and Miller developed the concept of morphological integration, proposing that traits that interacted in development or function would tend to evolve together. Indeed, primates generally share a common pattern of total morphological integration across the entire cranium and have high correlations among developmentally related traits. Morphological integration occurs within the oro-facial and neuro-cranial regions. Apes and humans also fit this total pattern of morphological integration with primary contributions from the oral region and to a lesser extent the zygomatic regions. A literature review (Ackermann & Cheverud, 2004) concludes that there is a general pattern of morphological integration in primates. Research (Cheverud, 1982, 1989) indicates that even though Old World and New World monkeys evolved separately for 30 million years, baboons have similar patterns of morphological integration in the cranium to New World primates.

In *Papio*, connectivity matrices were designed to assess morphological integration within six regions of the face – base, vault, oral, nasal, zygomatic, orbit and within the cranium as a whole – consistent with these other studies of primate integration. Matrix correlations between observed correlation matrices of all six species are positive and significant. All the species show a similarly high level of total integration, as indicated by the high correlation values for the total integration matrix and by the similar relative contributions of oral, zygomatic, and nasal to this pattern of total integration. Primary contributions to morphological integration in the baboon cranium come from the nasal, oral, and zygomatic regions and to a lesser extent the orbit, base and vault regions.

Overall, the nasal region appears to be the most highly integrated and the orbital region the least integrated. After this small differences emerge among the species.

Differences in the magnitude of integration (i.e. a high degree of integration) may provide some insight into how selection has acted on baboons. Understanding of morphological integration in primates is important because if integration and variation are not constant across primates, then models that use extant variation to assess fossil relationships might not be justifiable (Ackermann, 2003b). Also, because morphological integration plays an important role in directing evolutionary change, the understanding trait relationships can help us with questions of evolutionary processes (Ackermann, 2005)

Summary of Results for Hypothesis 2:

The results presented here indicate that baboons share a common pattern of variation/covariation and integration and fit the typical pattern of primate integration. Cranial integration for *Papio* and *Theropithecus* can be summarized as follows: a high degree of total integration throughout the entire cranium, with primarily contributions by the nasal and oral units.

EVOLUTIONARY DIVERSIFICATION

The objective here was to determine whether morphological diversification among baboons is consistent with genetic drift. Evolutionary forces depend on intraspecific variation as a fuel for population diversification, and therefore

morphological change through time is rooted in an understanding of variation within populations. In this case, if random genetic drift is responsible for the evolutionary diversification of baboons, patterns of within and between taxon morphological variance/covariance should be proportional.

The ecology and behaviour of baboons has been the subject of many studies. Baboons are extremely diverse feeders that subsist on fruits, roots, tubers, grass seeds, gums and leaves (Fleagle, 1999). Baboons are also highly sexually dimorphic (Rowe, 1996). Primate diets are closely linked to body size; species that tend to be relatively small tend to eat leaves, whereas those that eat leaves tend to be relatively large. As noted by Fleagle (1999:286) “these patterns result from the interaction of several, size-related phenomena. First, primates need a balanced diet that not only meets their caloric needs but also their other nutritional requirements”. Further, natural selection may relate to size, and be linked to diet (Kay, 1984). Diet has also been shown to contribute to size differences in the evolution of the human diet, supporting the notion that baboons may make a better analogy for early hominid evolution than the great apes (Ungar & Teaford, 1996).

Indeed, the analysis of *Papio* and *Theropithecus* does show that natural selection has acted on this clade. This is also the case for *Papio*, where the regressions of logged between-group variation against within-group variation had a slope greater than one. Lineage divergence within this genus is therefore unlikely due to genetic drift alone. However, the results when the *P. kindae* baboon is eliminated from the analysis are quite different, and indicate that the remaining members of this genus could indeed have

diversified under neutral processes of evolution. Stated differently, the current data suggest that natural selection is probably selecting for diversification of *P. kindae* (generally lumped with *P. cynocephalus*). The allometry vectors indicate that the taxa generally share a common pattern of allometry; this suggests that differences among all the taxa are in terms of size (and size-related shape), but that *P. kindae* are extremely divergent in size and that this has been selected for in this lineage.

There have been numerous explanations for the evolutionary diversification of callitrichids (Primates, Platyrrhini) (Ferrari, 1993a, 1993b; Cropp, 1997; Cropp et al., 1999; Ackermann & Cheverud, 2002). Ackermann & Cheverud (2002) show that selection may be selecting for size differences among small bodied and large bodied members of the genus *Saguinus*. Ultimately their hypothesis is consistent with selection acting for a specialization in the use of vertical postures related to diet and foraging. Marroig et al. (2004) also investigated evolutionary processes in sakis. One selective trend observed in their quantitative analyses is enhanced prognathism. However they warn that mandibular depth and cranial base angles were not included in the analysis and could also be subject to diversifying selection (Marroig et al., 2004). In both cases, ultimately genetic drift cannot be ruled out as an explanation for cranial morphological diversification among these New World monkeys. Marroig and Cheverud (2001) also investigated evolutionary processes across Platyrrhines. Their data show that differences in phenotypic structure are correlated with differences in feeding habits indicating that changes in skull traits are associated with changes in feeding habits. Studies of New World monkeys prove that they are appropriate for broad scale inquiry into evolutionary

processes and show that selection is related to size which is related to diet and foraging. Ultimately, data support the premise that diversification can be explained by genetic drift.

Summary of Results for Hypothesis 3:

Diversification in *Papio* and *Theropithecus* can not be explained by genetic drift alone. Observed patterns of cranial variation between *Papio* and *Theropithecus* suggests that natural selection has acted to diversify this clade; the same holds for diversification of taxa within the entire *Papio* clade. However, when the *P. kindae* baboon is removed, the results are consistent with drift.

P. URSINUS AND THE P. KINDAE QUESTION

Throughout these analyses two patterns have recurred – the separation of *P. kindae*, and to a lesser extent *P. ursinus*, from the rest of *Papio*, and the similarities between *P. anubis* and *P. cynocephalus*. Principal component analysis separated both *P. ursinus* and *P. kindae* while showing an overlap of *P. anubis* and *P. cynocephalus*. *P. ursinus* also displayed clear (but unexplained) dimorphism, unlike the other taxa. Discriminate function analysis made correct assignments for *P. ursinus* and *P. kindae*, but, again, there was an overlap of *P. anubis* and *P. cynocephalus*. Mahalanobis distances indicated that the greatest distances were between *P. kindae* and all other species. Additionally, the high and low Mahalanobis distances can be attributed to

geographic proximity. When covariance and correlation patterns were analyzed, *P. kindae* had the lowest correlations between themselves and all other species. Despite being classified as a subspecies of *P. cynocephalus*, *P. kindae* and *P. cynocephalus* had the second lowest matrix correlation. *P. anubis* and *P. cynocephalus* had the highest matrix correlations.

Overall, *P. ursinus* and *P. kindae* are morphologically distinct and *P. anubis* and *P. cynocephalus* are similar. The dissimilarity of *P. ursinus* makes sense given that it is the basal species in this lineage. Additionally, the results of this study support the idea that *P. ursinus* is a very variable species. *P. kindae* morphologically stands out as the smallest species and the most interesting taxonomically. Upon examination of the evolutionary diversification in *Papio*, results indicate that natural selection and not genetic drift is the driving force behind diversification of *P. kindae*. This data suggests that *P. kindae* is a distinct morph, and indeed may be the most divergent from the other *Papio* taxa in terms of its evolutionary history.

FUTURE RESEARCH

This study has supported work that indicates the distinctiveness of baboon taxa, and especially the distinctiveness of *P. kindae*. It has also offered genetic drift as an explanation for the divergence of much of the clade, although clearly the evolutionary processes affecting *P. kindae* differed. Future research should focus on the *P. kindae* baboon, in order to try to understand the selective pressures acting to diversify this taxon. Research could also focus on deciphering whether *P. kindae* may be the ancestral form of

the Papionini as mentioned by Groves (personal communication). Future research should also focus on taking a closer look at patterns of variation within the species examined here. Of particular interest is a deeper understanding of the source of the dimorphism within the chacma baboon. Since *P. ursinus* does not separate on the basis of sexual dimorphism or geography, there needs to be more research into the variability of this baboon.

Another avenue of research should investigate how the population structure of a widespread, diverse, open-country catarhine might parallel that of our early (pre-150 kya) hominin ancestors, and, as a result, how the patterning of morphological variation in baboons might offer some insight into that of hominoid and hominin evolution.

Additionally, studies of craniofacial variation can provide further insight into how nutrition and environmental stressors affect phenotypic variation; this, too, can be applied to investigating fossil and living human and non-human primate morphological variation.

BIBLIOGRAPHY

- Ackermann, R.R. (1998). *A Quantitative Assessment of Variability in the Australopithecine, Human, Chimpanzee, and Gorilla Face*. Ph.D. Dissertation, Washington University: St. Louis.
- Ackermann, R.R. (2002). Patterns of covariation in the hominoid craniofacial skeleton: implications for palaeoanthropological models. *Journal of Human Evolution* 43:167-187.
- Ackermann, R.R. (2003a). Morphological integration in hominoids: a tool for understanding human evolution. *American Journal of Physical Anthropology* 32(Suppl):35.
- Ackermann, R.R. (2003b). Using extant morphological variation to understand fossil relationships: a cautionary tool. *South African Journal Science* 99:255-258.
- Ackermann, R.R. (2005). Ontogenetic integration of the Hominoid face. *Journal of Human Evolution* 48:175-197.
- Ackermann, R.R. & Cheverud, J.M. (2000). Phenotypic covariance structure in tamarines (genus: *Saguinus*): a comparison of variation patterns using matrix correlation and common principal component analysis. *American Journal of Physical Anthropology* 111:489-501.
- Ackermann, R.R. & Cheverud, J.M. (2002). Discerning evolutionary processes in patterns of tamarin (Genus *Saguinus*) craniofacial variation. *American Journal of Physical Anthropology* 117:260-271.

- Ackermann, R.R. & Cheverud, J.M. (2004a). Detecting genetic drift versus selection in human evolution. *Proceedings of the National Academy of Science USA* 101:17946-17951.
- Ackermann, R.R. & Cheverud, J.M. (2004b). Morphological Integration in Primate Evolution. In: (M. Pigliucci, & K. Preston, Eds.) *Phenotypic Integration: Studying the Ecology and Evolution of Complex Phenotypes*, Pp. 302-319. Oxford: Oxford University Press.
- Alberts, S.C. & Altmann, J. (2001). Immigration and hybridization patterns of yellow and anubis baboons in and around Amboseli, Kenya. *American Journal of Primatology* 53:139-154.
- Albrecht, G.M. (1978). The cranial morphology of the Sulawesi macaques. *Contributions to Primatology* 13:1-151.
- Albrecht, G.H. & Miller, J.M.A. (1993). Geographic Variation in Primates: A Review with Implications for Interpreting Fossils. In (W.H. Kimbel & L.B. Martin, Eds.) *Species, Species Concepts, and Primate Evolution*. Pp. 123-161. New York: Plenum Press.
- Albrecht, G.M., Gelvin, B.R., & Miller, J.M.A. (2003). The hierarchy of intraspecific craniometric variation in gorillas: a population-thinking approach with implications for fossil species recognition studies. In (A.B. Taylor & M.L. Goldsmith, Eds.) *Gorilla Biology: A Multidisciplinary Perspective*. Pp. 62-103. Cambridge, UK: Cambridge University Press.
- Alonso, C., Faria, D.S., Langguth, A., & Santee, D.P. (1987). Variação de pelagem na área de intergradação entre *Callithrix jacchus* e *Callithrix penicillata*. *Brazilian Journal of Biology* 47:465-470.

- Altmann, J. (1980). *Baboon Mothers and Infants*. Cambridge: Harvard University Press.
- Anderson, M.R., Covert, H.H., Dao, V., & Thanh, V. (2007). Cercopithecoid cranial variation of the primates of Vietnam. *American Journal of Physical Anthropology* 44(suppl):64.
- Ansell, W.F.H. (1978). *The Mammals of Zambia*. Chilanga: National Parks and Wildlife Service.
- Bastir, M., & Rosas, A. (2005). Hierarchical nature of morphological integration and modularity in the human posterior face. *American Journal of Physical Anthropology* 128:26-34.
- Bastir, M., & Rosas, A. (2006). Correlated variation between the lateral basicranium and the face: a geometric morphometric study in different human groups. *Archives of Oral Biology* 51:814-824.
- Bilginer, G.M., Vakif, D., & Atalay, B. (2001). The common vector approach and its relation to principal component analysis. *IEEE Transactions on Speech & Audio Processing* 9(6):655-662.
- Bastir, M., Rosas, A., & O'Higgins, P. (2006). Craniofacial levels and the morphological maturation of the human skull. *Journal of Anatomy* 209:637-654.
- Bookstein, F., Gunz, P., Mitteroecker, P., Prossinger, H., Schafer, K., & Seidler, H. (2003). Cranial Integration in *Homo*: Singular Warps Analysis of the Midsagittal Plane in Ontogeny and Evolution. *Journal of Human Evolution* 44:167-187.
- Brown, T. (2006). *Confirmatory Factor Analysis for Applied Research*. New York: The Guilford Press.

- Burrell, A. (2008). *Phylogenetics and Population Genetics of Central African Baboons*. Ph.D. Dissertation, New York University.
- Cardini, A. & Elton, S. (2008). Variation in guenon skulls (I): species divergence, ecological, and genetic differences. *Journal of Human Evolution* 54:615-637.
- Cheverud, J.M. (1982). Phenotypic, genetic, and environmental morphological integration in the cranium. *Evolution* 36(3):499-516.
- Cheverud, J.M. (1985). Quantitative genetics and developmental constraints on evolution by selection. *Journal of Theoretical Biology* 110:155-172
- Cheverud, J.M. (1988a). A comparison of genetic and phenotypic correlations. *Evolution* 42:958-968.
- Cheverud, J.M. (1988b). Spatial-analysis in morphology illustrated by rhesus macaque cranial growth and integration. *American Journal of Physical Anthropology* 75:195-196
- Cheverud, J.M. (1989). A comparative analysis of morphological variation patterns in the Papionins. *Evolution* 43(8):1737-1747.
- Cheverud, J.M. (1995). Morphological integration in the saddle-backed tamarin (*Saguinus fuscicollis*) cranium. *The American Naturalist* 145:63-89.
- Cheverud, J.M. (1996a). Developmental integration and the evolution of pleiotropy. *American Zoologist* 36:44-50.
- Cheverud, J.M. (1996b). Quantitative genetic analysis of cranial morphology in the cotton-top (*Saguinus oedipus*) and saddle-back (*S. fuscicollis*) tamarins. *Journal of Evolutionary Biology* 9:5-42.

- Cheverud, J.M. and L. Leamy. 1985. Quantitative genetics and the evolution of ontogeny. III. Ontogenetic changes in correlation structure among live-body traits in randombred mice. *Genetical Research* 46: 325-335.
- Cheverud, J.M., Rutledge, J.J., & Atchley, W.R. (1983). Quantitative genetics of development: genetic correlations among age-specific trait values and the evolution of ontogeny. *Evolution* 46:1965-1967.
- Cheverud, J.M., Wagner, G.P., & Dow, M.M. (1989). Methods for the comparative-analysis of variation patterns. *Systematic Zoology* 38:201-213.
- Coimbra-Filho, A.F., Pissinatti, A., & Rylands, A.B. (1993). Experimental Multiple Hybridism and Natural Hybrids Among *Callithrix* Species from Eastern Brazil. In (A.B. Rylands, Ed.) *Marmosets and Tamarins: Systematics, Behavior, and Ecology*, Pp. 95-120. Oxford: Oxford University Press.
- Comrey, A.L. & Lee, H. B. (1992). *A First Course in Factor Analysis*. (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.
- Craycraft, J. (1987). Species Concepts and Speciation Analysis. In (M. Ereshefky, Ed.) *The Units of Evolution: Essays on the Nature of Species*, Pp. 93-120. Cambridge: MIT Press.
- Crook, J.H. (1966). Gelada baboon herd structure and movement: A comparative report. *Symposium of the Zoological Society of London* 18:237-258.
- Crook, J.H. (1972). Sexual Selection, Dimorphism, and the Social Organization in the Primates. In (B.G. Campbell, Ed.) *Sexual Selection and the Decent of Man 1871-1971*, Pp. 231-281. Chicago: Aldine.

- Cropp, S. (1997). *Evolutionary Diversification Among Tamarins (Genus Saguinus)*. Ph.D. Dissertation, Washington University: St. Louis, Missouri.
- Cropp, S., Larson, A., & Cheverud, J.M. (1999). Historical biogeography of tamarins, genus *Saguinus*: The molecular phylogenetic evidence. *American Journal of Physical Anthropology*. 108:65-89.
- Dagosto, M., Gebo, D.L., & Dolino, C.N. (2003). The natural history of the Philippine tarsier (*Tarsius syrichta*). In (P.C. Wright, E.L. Simons, & S. Gursky, Ed.) *Tarsiers: Past, Present, and Future*, Pp. 237-259. New Jersey: Rutgers University Press.
- Darroch, J.N. & Mosimann, J.E. (1985). Canonical and principal components of shape. *Biometrika* 72:241-252.
- DeVivo, M. (1991). *Taxonomia de Callithrix Erxleben, 1977 (Callitrichidea, Primates)*. Belo Horizonte: Fundação Biodiversitas.
- DeVore, I. & Wahburn, S.L. (1963). Baboon ecology and human evolution. *African Ecology and Human Evolution*.
- Defrise-Gussenhoven, E. (1967). Generalized distance in genetic studies. *Acta Geneticae Medicae et Gemellologiae* 17: 275–288.
- Delson, E. (1978). Models of Early Hominid Phylogeny. In (Jolly, C. J., Ed). *Early Hominids of Africa*. Pp. 517-541. London: Duckworth.
- Dierbach, A. (1986). Intraspecific variability and sexual dimorphism in the skulls of *Pan troglodytes* versus. *Human Evolution* 1:41-50.

- Disotell, T.R. (1994). Generic relationships of the Papionini (Cercopithecoidea). *American Journal of Physical Anthropology* 94:47-57.
- Disotell, T.R., Honeycutt, R.L., & Ruvolo, M. (1992). Mitochondrial DNA phylogeny of the Old-World monkey tribe Papionini. *Molecular Biology and Evolution* 9(1):1-13.
- Ferrari, S.F. (1993a). The adaptive radiation of Amazonian callitrichids (Primates, Platyrrhini). *Evolutionary Biology* 7:81-103.
- Ferrari, S.F. (1993b). Ecological Differentiation in the Callitrichidae. In (A.B. Rylands, Ed.) *Marmosets and Tamarins: Systematics, Ecology, and Behavior*. Pp. 314-328. New York: Oxford University Press.
- Ferrari, S.F. & Mendes, S.L. (1991). Buffy-headed marmosets 10 years on. *Oryx* 25:105-109.
- Fleagle, J.G. (1999). *Primate Adaptation and Evolution*. New York: Academic Press.
- Floyd, F.J. & Widaman, K.F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment* 7(3):286-299.
- Freedman, L. (1963). A biometric study of *Papio cynocephalus* skulls from northern Rhodesia and Nyasaland. *Journal of Mammalogy* 44:24-43.
- Frost, S.R., Marcus, L.F., Brookstein, F.L., Reddy, D.P. & Delson, E. (2003). Cranial allometry, phylogeography, and systematics of large-bodied Papionins (Primates: Cercopithecinae) inferred from geometric morphometric analysis of landmark data. *Anatomical Record* 275A:1048-1072.

- Gingerich, P.H. & Ryan, A.S. (1979). Dental and cranial variation in living Indriidae. *Primates* 20(1):141-159.
- Gonzalez-José, R., Van der Molen, S., Gonzalez-Perez, E., & Hernandez, M. (2004). Patterns of phenotypic covariation and correlation in modern humans as viewed from morphological variation. *American Journal of Physical Anthropology* 123:69-77.
- Goodman, M., Porter, C.A., Czelusniak, J., Page, S.L., Schneider, H., Shoshani, J., Gunnell, & Groves, C.P. (1988). Toward a phylogenetic classification of Primates based on DNA evidence complemented by fossil evidence. *Molecular Phylogenetics and Evolution* 9:585-598.
- Goswami, A. (2006). Morphological integration in the carnivoran skull. *Evolution* 60(1): 169-183.
- Groves, C.P. (1993). Order Primates. In (D.E. Wilson & D.M. Reader, Eds.) *Mammalian Species of the World: A Taxonomic and Geographic Reference*, 2nd ed. Pp. 243-277. Washington DC: Smithsonian Institution Press.
- Groves, C. (2001). *Primate Taxonomy*. Washington, D.C.: Smithsonian Institution Press.
- Grubb, P., Butynski, T.M., Oats, J.F., Bearder, S.K., Disotell, T. R., Groves, C.P., & Struhsaker, T.T. (2003). Assessment of the diversity of African primates. *International Journal of Primatology* 24:1301-1357.
- Hallgrímsson, B. & Hall, B.K. (2005). Variation and Variability: Central Concepts in Biology. In (B. Hallgrímsson & B.K. Hall, Eds.) *Variation: A Central Concept in Biology*, Pp. 1-7. Elsevier: Academic Press.

- Hanihara, T. & Natori, M. (1988). An analysis of interspecific relationships of *Saguinus* based on cranial measurements. *Primates* 29:255-262.
- Hanihara, T. & Natori, M. (1989). Evolutionary trends of the hairy-face *Saguinus* in terms of the dental and cranial morphology. *Primates* 30(4):531-541.
- Hanken, J. & Hall, B. (1993). *The Skull, Vol. 1. Development*. Chicago: University of Chicago Press.
- Hayes, J.F. & Hill, W.G. (1981). Modification of estimates of parameters in the construction of genetic covariance matrices („bending’). *Biometrics* 37:483-493.
- Hershkovitz, P. (1977). *Living New World Monkeys (Platyrrhini)*. Chicago: University of Chicago Press.
- Hill, W.G. & Thompson, R. (1978). Probabilities of non-positive definite between-group or genetic covariance matrices. *Biometrics* 34:429-439.
- Hunt, J.H. (2004). *Morphological Integration of the Catarrhine Cranium: An Ontogenetic and Phylogenetic Perspective*. Ph.D. Dissertation, Yale University.
- Jabbour, R.S. (2007). Patterns of geographic variation in hands and feet of *Pan* and *Gorilla*. *American Journal of Physical Anthropology* 44(suppl):134.
- Jolicoeur, P. (1963). The multivariate generalization of the allometry equation. *Biometrics* 19:497-499.
- Jolly, C.J. (1970a). The Seedeaters: A New Model of Hominid Differentiation Based on a Baboon Analogy. *Man, n.s.* 5:5-26.

- Jolly, C.J. (1970b). The Large African Monkeys as an Adaptive Array. In (J.R. Napier & P.H. Napier, Eds.) *Old World Monkeys*, Pp. 141-174. New York: Academic Press.
- Jolly, C.J. (1972). The classification and natural history of *Theropithecus* (*Simopithecus*) (Andrews, 1916), baboons of the African Plio-Pleistocene. *Bulletin of the British Museum (Natural History) Geology* 22:1-123.
- Jolly, C.J. (1993). Species, Subspecies, and Baboon Systematics. In (W. Kimball, L. Martin, Eds.) *Species, Species Concepts, and Primate Evolution*, Pp. 67-107. New York: Wiley.
- Jolly, C.J. (2001). A proper study for mankind: Analogies from the papionin monkeys and their implications for human evolution. *Yearbook of Physical Anthropology* 33: 177-204
- Jolly, C.J. (2003). Cranial anatomy and baboon diversity. *Anatomical Record* 257A:1043-1047.
- Jolly, C.J. & Brett, F.L. (1973). Genetic markers and baboon biology. *Journal of Medical Primatology* 2:85-99
- Jorjani, H., Klei, L., & Emanuelson, U. (1988). A simple method for weighted bending of genetic co(variance) matrices. *Journal of Dairy Science*. 86:677-679.
- Jungers, W.L., Falsetti, A.B., & Wall, C.E. (1995). Shape, relative size, and size-adjustments in morphometrics. *Yearbook of Physical Anthropology* 38:137-161

- Kamilar, J.M. (2006). Geographic Variation in Savannah Baboon (*Papio*) Ecology and its Taxonomic and Evolutionary Implications. In: (S.M. Lehman & J.G. Fleagle, Eds.) *Primate Biogeography: Progress and Prospects*, Pp. 169-200. New York: Springer.
- Kingdon, J. (1997). *The Kingdon Field Guide to African Mammals*. London: Academic Press.
- Koorts, K.R. & Gibson, J.P. (1996). Realized sampling variances of estimates of genetic parameters and the differences between genetic and phenotypic correlations. *Genetics* 143:1409-1416.
- Lande, R. (1979). Quantitative genetic analysis of multivariate evolution, applied to brain: body size allometry. *Evolution* 33:402-416.
- Lande, R. (1980). Genetic variation and phenotypic evolution during allopatric speciation. *American Naturalist* 116:463-479.
- Leiberman, D.E., Carlo, J., Ponce de Leon, M., Zollikofer, C.P.E. (2007). A geometric morphometric analysis of heterochrony in the cranium of chimpanzees and bonobos. *Journal of Human Evolution* 52:647-662
- Leiberman, D.E., Pearson, O.M. & Mowbray, K.M. (2000). Basicranial influence on overall cranial shape. *Journal of Human Evolution* 38:291-315.
- Leiberman, D.E., Ross, C.F., & Ravosa, M.J. (2000 OR 2001). The primate cranial base: ontogeny, function, and integration. *Yearbook of Physical Anthropology* 43:117-169.
- Leigh, S.R. (2005). Cranial ontogeny of *Papio* ontogeny (*Papio hamadryas*). *American Journal of Physical Anthropology* 130(1):71-84.

- Leigh, S.R. & Cheverud, J.M. (1991). Sexual dimorphism in the baboon facial skeleton. *American Journal of Physical Anthropology* 84:193-208.
- Leigh, S.R., Relethford, J.H., Park, P.B., & Konigsberg, L.W. (2003). Patterns of Diversity in Gorilla Cranial Morphology. In (A.B. Taylor & M.L. Goldsmith, Eds.) *Gorilla Biology: A Multidisciplinary Perspective*, Pp. 104-131. Cambridge: Cambridge University Press.
- Lofsvold, D. (1988). Quantitative genetics of morphological differentiation in *Peromyscus*. II. Analysis of selection and drift. *Evolution* 42:54-67.
- Macdonald, D., Ed. (1985). *Primates*. New York: Torstar Books.
- Machado, A. de B. (1969). Maníferos de Angola ainda não citados ou pouco conhecidos. *Publicações Culturais da Companhia de Diamantes de Angola*. 46:93-233.
- Marriog, G. & Cheverud, J.M. (2001). A comparison of phenotypic variation and covariation patterns and the role of phylogeny, ecology, and ontogeny during cranial evolution of new world monkeys. *Evolution* 55:2576-2600.
- Marriog, G. & Cheverud, J.M. (2004a). Did natural selection or genetic drift product the cranial diversification of Neotropical monkeys? *American Naturalist* 163(3):417-428.
- Marriog, G. & Cheverud, J.M. (2004b). Cranial evolution in sakis (*Pithecia*, Platyrrhini) I: interspecific differentiation and allometric patterns. *American Journal of Physical Anthropology* 125:266-278.

- Marroig, G. & Cheverud, J.M. (2005). Size as a line of least evolutionary resistance: Diet and adaptive morphological radiation in New World Monkeys. *Evolution* 59:1128-1142.
- Marroig, G., Cropp, S., & Cheverud, J.M. (2003). Systematics and evolution of the Jaccus group of marmosets (Platyrrhini). *American Journal of Physical Anthropology* 123:11-22.
- Marroig, G., De Vivo, M., & Cheverud, J.M. (2004). Cranial evolution in sakis (*Pithecia*, Platyrrhini) II: evolutionary processes and morphological integration. *Journal of Evolutionary Biology* 17:144-155.
- Martin, R.D. (1993). Allometric Aspects of Skull Morphology in *Theropithecus*. In (N. J Jablonski, Ed.) *Theropithecus: The Rise and fall of a Primate Genus*. Cambridge: Cambridge University Press. Pp. 273-298.
- Martin, R.D. & MacLarnon, A.M. (1988). Quantitative Comparisons of the Skull and Teeth in Guenons. In (A. Gautier-Horn, F. Boulière, J. Gautier, & J. Kingdon, Eds.) *A Primate Radiation: Evolutionary Biology of the African Guenons*, Pp. 170-183. New York: Cambridge University Press.
- Mayr, E. (1942). *Systematics and the Origin of Species*. New York: Columbia University Press.
- Mayr, E. (1982). *The Growth of Biological Thought: Diversity, Evolution, and Inheritance*. Cambridge, MA: Belknap.
- Mendes, S.L. (1993). Distribuição Geográfica e Estado de Conservação de *Callithrix flaviceps* (Primates: Callithrichidae). In (Yamamoto, M.E. & M.B.C. de Sousa, Eds.) *A Primatologica no Brasil, Vol. 4*. Pp. 139-154. Natal: Editora Universitária.

- Mendes, S.L. (1997). Hybridization in free-ranging *Callithrix flaviceps* and the taxonomy of the Atlantic forest marmosets. *Neotrop. Primates* 5:6-8.
- McNulty, K.P. (2003). *Geometric Morphometric Analyses of Extant and Fossil Hominoid Craniofacial Morphology*. Ph.D. Dissertation, The City University of New York.
- McNulty, K.P. (2004). A geometric morphometric assessment of hominoid crania: Conservative African apes and their liberal implications. *Folia Primatologica* 75:348.
- Mitteroecker, P. & Bookstein, F. (2008). The evolutionary role of modularity and integration in the hominoid cranium. *Evolution* 62(4):943-958.
- Moore, A.J. & Cheverud, J.M. (1992). Systematics of the *Saguinus oedipus* group of the bare-faced tamarins: Evidence from facial morphology. *American Journal of Physical Anthropology* 89:73-84.
- Nagel, U. (1973). A comparison of anubis baboons, hamadryas baboons, and their hybrids at a species border in Ethiopia. *Folia Primatologica* 19:104-165
- Napier, P.H. (1981). *Catalogue of Primates in the British Museum (Natural History) and Elsewhere in the British Isles. Part 2: Family Cercopithecidae, Subfamily Cercopithecinae*. London: British Museum (Natural History).
- Natori, M. (1994). Craniometrical variations among eastern Brazilian marmosets and their systematic relationships. *Primates* 35(2):167-176.
- Newman, T.K., Jolly, C.J. & Rogers, J. (2003). Mitochondrial phylogeny and systematics of baboons (*Papio*). *American Journal of Physical Anthropology* 124(1):17-27.

- O'Higgins, P. & Collard, M. (2002). Sexual dimorphism and facial growth in papionin monkeys. *Journal of Zoology London* 257:255-272.
- Oliver, W.L.R. & Santos, I.B. (1991). Threatened endemic mammals of the Atlantic forest region of south-east Brazil. *Wildlife Preservation Trust, special scientific report 4* Philadelphia, PA. Pp. 1-126.
- Olson, E. & Miller, R. (1958). *Morphological Integration*. Chicago: University of Chicago Press.
- Pan, R.L. & Groves, C. P. (2004). Cranial Variation Among the Asian Colobines. In (F. Anapol & N. Jablonski, Eds.) *Shaping Primate Evolution*, Pp. 45-65. Cambridge: Cambridge University Press.
- Philips-Conroy, J.E., Jolly, C.J., & Brett, F.L. (1991). Characteristics of Hamadryas-like male baboon troops in the Awash hybrid zone, Ethiopia. *American Journal of Physical Anthropology* 86:353-368.
- Polanski, J.M. & Franciscus, R.G. (2006). Patterns of craniofacial integration in extant *Homo*, *Pan*, and *Gorilla*. *American Journal of Physical Anthropology* 131:38-49.
- Randall, F.E. (1943). The skeleton and dental development and variability of the gorilla. *Human Biology* 15:236-254.
- Reyment, R.A. (1991). *Multidimensional Paleobiology*. Oxford: Pergamon Press.
- Reyment, R.A., Blacksmith, R.E. & Campbell, N.A. (1984). *Multivariate Morphometrics* (2nd ed.). New York: Academic Press.
- Roff, D.A. (1995). An estimation of genetic correlations from phenotypic correlations- A test of Cheverud's conjecture. *Heredity* 74:481-490.

- Roff, D.A. (1996). The evolution of genetic correlations: an analysis of patterns. *Evolution* 50:1392-1403.
- Rogers, J. (2000). Molecular Genetic Variation and Population Structure in *Papio* Baboons. In (P.F. Whitehead & C.J. Jolly, Eds.) *Old World Monkeys*, Pp. 57-76. Cambridge: Cambridge University Press.
- Rogers J., Burrell, A.S., Cotterill, F.D.P. & Jolly, C.J. (2004). A preliminary report on the ‚*P. kindae*’ baboons of Zambia. *Folia Primatologica* 75:61.
- Rosenberger, A.L., Norconk, M.A., & Garber, P.A. (1996). New perspectives on the Pitheciines. In (M.A. Noconk, A.L. Rosenberger, & P.A. Garber, Eds.) *Adaptive Radiations of Neotropical Primates*, Pp. 329-333. New York: Plenum.
- Rowe, N. (1996). *The Pictorial Guide to the Living Primates*. New York: Pogonias Press.
- Rylands, A.B., Schneider, H., Tornisielo, W.R., de Sá, R.L., Kierulff, M.C.M., & Santos, I.B. (1988). Primates of the Rio Jequitinhona valley, Minas Gerias, Brazil. *Primate Conservation* 9:100-109.
- Sakka, M. (1985). Sexual Dimorphism in the Great Apes: The skull of the gorilla. In (J. Ghesquiere, R.D. Martin, & F. Newcombe, Eds.) *Human Sexual Dimorphism*, Pp. 79-103. London & Philadelphia: Taylor & Francis.
- Samuels, A. & Altmann, J. (1986). Immigration of a *Papio anubis* male into a group of cynocephalus baboons and evidence for a anubis-cynocephalus hybrid zone in Amboseli, Kenya. *International Journal of Primatology* 7:131-138.

- Shea, B.T., Leigh, S.R., & Groves, C.P. (1993). Multivariate Craniometric Variation in Chimpanzees: Implications for Species Identification. In (W.H. Kimbel & L.B. Martin, Eds.) *Species, Species Concepts, and Primate Evolution*, Pp. 265-296. New York: Plenum Press.
- Singleton, A.M. (2002). Patterns of cranial shape variation in the Papionini (Primates: Cercopithecinae). *Journal of Human Evolution* 42:547-578.
- Small, C.G. (1996). *The Statistical Theory of Shape*. Springer.
- Sneath, P & Sokal, R. (1972). *Numerical Taxonomy*. W.H. Freeman: San Francisco.
- Strait, D.S. (2001). Integration, phylogeny, and the hominid cranial base. *American Journal of Physical Anthropology* 114:273-297.
- Steppan, S.J. (1997b). Phylogenetic analysis of phenotypic covariance structure. II. Reconstructing matrix evolution. *Evolution* 51:587-594.
- Stump, D.P. (2007). Variation in craniofacial fusion in the Galagidae. *American Journal of Physical Anthropology* 44(suppl):227.
- Stumpf, R.M., Polk, J.D., Oats, J.F., Jungers, W.L., Heesy, C.P., Groves, C.P., & Fleagle, J.G. (2003). Patterns of Diversity in Gorilla Cranial Morphology. In (A.B. Taylor & M.L. Goldsmith, Eds.) *Gorilla Biology: A Multidisciplinary Perspective*, Pp. 35-61. Cambridge: Cambridge University Press.
- Sugawara, K. (1979). Socioecological study of a wild group of hybrid baboons between *Papio anubis* and *P. hamadryas* in the Awash Valley, Ethiopia. *Primates* 20:21-56.

- Thorington, R. & Groves, C. (1970). An Annotated Classification of the Cercopithecoidae. In (J.R. Napier & P.H. Napier, Eds.) *Old World Monkeys: Evolution, Systematics, and Behavior*. Pp. 629-644. London: Academic Press.
- Ungar, P.S. & Teaford, M.F. (1996). A preliminary examination of non-occlusal dental microwear in anthropoids: implication for the study of fossil primates. *American Journal of Physical Anthropology* 100:101-113
- van Valen, L. (1976). Ecological species, multispecies, and oaks. *Taxon* 25:233-239.
- Viguiier, B. (2004). Functional constraints on the craniofacial morphology of Malagasy primates, with a focus on the shape variations associated with gummivory in the family Cheirogaleidae. *Folia Primatologica* 75:342.
- Ward, J. H. (1963). Hierarchical grouping to optimize an objective function. *Journal of the American Statistical Association* 58:236-244.
- Weaver, T.D., Roseman, C.C., & Stringer, C.B. (2007). Were neandertal and modern human cranial differences produced by natural selection or genetic drift? *Journal of Human Evolution* 53:135-145.
- Williams-Blangero, S., Vanderberg, J.L., Konigsberg, L., & Dyke, B. (1990). Genetic differentiation between baboon subspecies: Relevance for biomedical research. *American Journal of Primatology* 20:67-81.
- Wolfe, L.D. (2004). Biological anthropology section. *Anthropology News*, Pp. 46.
- Wright, S. (1968). *Evolution and the Genetics of Populations: A Treatise. Vol. 4*. Chicago: University of Chicago Press.

Young, N.M. (2003). A reassessment of living hominoid postcranial variability: Implications for ape evolution. *Journal of Human Evolution* 45:441-464.

Young, N.M. (2006). Function, ontogeny, and canalization of shape variance in the primate scapula. *Journal of Anatomy* 209:623-636.

University of Cape Town

	A	B	C	D	E	F	G	H	I	J
47	<i>P. anubis</i>	F	64.78141	63.30551943	51.51288336	70.06795015	69.22561326	177.9952413	153.5771674	70.88997546
48	<i>P. anubis</i>	F	63.82383639	63.10356814	49.62282377	68.96094286	64.36501198	172.8563655	152.2034567	70.94901866
49	<i>P. anubis</i>	F	71.36640562	68.41709936	47.89346269	70.39924043	67.89683869	180.2599142	157.6472045	72.27555557
50	<i>P. anubis</i>	F	64.91385767	62.19947031	47.43843038	68.20096651	63.80949499	179.0787057	154.2007551	76.1712739
51	<i>P. anubis</i>	F	65.78114747	65.04272404	43.86771589	67.97324996	65.72377075	177.3197729	154.9505637	72.83492705
52	<i>P. anubis</i>	F	63.13071818	61.31312739	50.85039372	66.87605666	65.03921808	180.1565738	161.1240395	71.88118065
53	<i>P. anubis</i>	F	69.39827626	66.77624097	48.34494354	75.00572685	74.86733631	186.9709322	164.5830159	69.52113248
54	<i>P. anubis</i>	F	69.20337679	70.15496411	46.2942265	83.49658385	73.74242909	218.0232	186.5621503	
55	<i>P. anubis</i>	F	77.14026217	73.8687063	49.86634062	83.71484448	73.48923168	227.342794	201.7142597	96.34701155
56	<i>P. anubis</i>	F	69.695665	71.26190937	47.32360513	78.37829173	75.14453952	205.2613543	175.403795	
57	<i>P. anubis</i>	F	62.70699497	61.1266346	44.87125885	68.84063882	65.50366671	165.3565339	143.1630454	70.67738568
58	<i>P. anubis</i>	F	66.72035915	64.40282277	47.73078887	70.12669263	71.60754641	178.1994313	157.8742379	68.40448711
59	<i>P. anubis</i>	F	68.43233527	64.64574615	56.045684	69.73081841	68.61083915	152.2335308	131.0954723	70.66068784
60	<i>P. anubis</i>	F	64.48081781	63.43027222	48.59961052	72.14932092	67.54366756	166.8233301	146.0934909	74.1893229
61	<i>P. anubis</i>	F	72.83216597	69.98172127	52.03343751	75.81326606		175.7560895	145.2876305	56.76117469
62	<i>P. anubis</i>	F	65.10407336	62.82445115	50.13963127	68.86278136	68.03117365	164.0401234	140.9858883	64.88666533
63	<i>P. anubis</i>	F	64.90376876	60.97313491	47.95142855	69.36407261	65.4099888	166.1851608	140.5055902	71.4996526
64	<i>P. anubis</i>	F	71.28843399	69.71012448	54.35619149	76.23024542	77.57274844	166.8792422	134.066531	63.32372286
65	<i>P. anubis</i>	F	73.53677363	71.38051068	52.80797175	69.23684959	76.12519805	172.7004518	148.66662	71.63007054
66	<i>P. anubis</i>	F	67.8651171	63.54406201	54.05491987	72.36682162	74.2766849		142.1777589	69.68225163
67	<i>P. anubis</i>	F	66.03455548	61.51779182	45.46442471	65.77059081	61.66870971	167.3786392	142.6885193	70.5365271
68	<i>P. anubis</i>	F	62.15087054	60.39033134	50.90087434	67.46180978	64.58334081	148.9777474	126.5364855	62.38916056
69	<i>P. anubis</i>	F	77.14345371	73.63166065	50.25484002	78.45754797	84.12361453	171.728691	136.1040064	67.8540222
70	<i>P. anubis</i>	F	76.41729147	74.13482245	49.44377309	83.63432711		169.4169628	131.049917	65.70524205
71	<i>P. anubis</i>	F	73.92385933	71.41846338	53.82129528	76.28827804	80.02197216	166.421657	137.8639647	64.29329393
72	<i>P. anubis</i> female	N=112								
73	MEAN		68.28954083	66.17239267	49.44035937	71.48061656	69.49292043	174.5355852	148.9129914	70.12451074
74	SD		5.01840141	4.87559688	3.339685782	5.349684455	5.785315689	17.87001506	15.76769213	8.578987975
75	MINIMUM		60.32809051	58.10672952	42.8008838	55.58052893	61.16167548	148.9540192	125.2426822	53.99736315
76	MAXIMUM		81.63390755	77.8376723	57.93887415	87.95896472	84.12361453	227.342794	201.7142597	96.34701155
77										
78	<i>P. anubis</i>	M	64.52073251	60.04425145	52.00413415	65.41057019	70.77003072	116.9176748	98.91656905	38.16139759
79	<i>P. anubis</i>	M	68.88329339	66.22003843	44.55514743	76.78551134	73.52682726	199.6677469	168.7643849	80.46820473
80	<i>P. anubis</i>	M	72.26105762	70.05597932	48.11952683	71.57969356	65.97568871	185.7615724	152.8794823	84.65143821
81	<i>P. anubis</i>	M	63.21777812	61.99608298	49.2011297	67.54005643	68.64652228	151.4316917	131.9167029	56.85435373
82	<i>P. anubis</i>	M	71.24288209	66.51763655	51.31733221	74.43608001	70.27230856	170.7940991	150.6698014	68.59728806
83	<i>P. anubis</i>	M	67.07061859	62.65438027	53.40112354	73.07502755	69.58436385	186.4496275	162.405399	76.32655655
84	<i>P. anubis</i>	M	63.65179295	62.20745409	48.98477912	71.18443125	68.52586596	165.5035565	142.8520193	68.48559837
85	<i>P. anubis</i>	M	69.80676468	67.10705508	49.23377955	70.80313667	65.07236919	175.2609675	154.5007347	65.17050358
86	<i>P. anubis</i>	M	69.21718928	66.83426792	40.42005229	72.07751827		188.3341716	156.1204526	70.74301033
87	<i>P. anubis</i>	M	68.74281299	65.88518045	45.34547165	71.84045765	71.51981171	184.7040254	153.1564628	77.46117184
88	<i>P. anubis</i>	M	72.80124033	70.43392097	49.58384186	75.28780047	76.10316161	190.1782722	156.2044982	77.30366981
89	<i>P. anubis</i>	M	63.08287308	61.57621785	48.14184031	67.91502998	68.73610771	149.6163653	124.0089944	59.54769464
90	<i>P. anubis</i>	M	75.98438791	75.15813309	52.23759713	75.69586666	74.30108837	181.8542443	155.1152213	74.11056691
91	<i>P. anubis</i>	M	67.75203015	65.55896728	43.24474191	70.32807188	72.29817266	194.1414551	166.0434154	85.07030035
92	<i>P. anubis</i>	M	71.94896848	69.95243505	49.36727518	75.50521472	71.71081545	180.6166039	155.0485954	74.2615138
93	<i>P. anubis</i>	M	72.58392533	68.41855002	46.08637374	79.13220226	75.61326547	201.4355934	165.5518481	90.63876226

	A	B	C	D	E	F	G	H	I	J
94	<i>P. anubis</i>	M	68.43551801	65.21924345	48.8542092	67.1277096	67.66789552	140.688627	115.2146176	53.08191781
95	<i>P. anubis</i>	M	61.09767151	60.43114073	50.62260374	66.48690145	66.26659301	133.0164727	111.8645031	49.65601718
96	<i>P. anubis</i>	M	68.76802208	67.21595648	53.67739789	73.44573223	67.15310048	180.8991044	155.9628408	78.02398103
97	<i>P. anubis</i>	M	69.28965702	66.17430898	52.02572753	70.23965453	70.85093996	189.0980951	166.0582009	75.92959224
98	<i>P. anubis</i>	M	68.71349471	66.1684507	53.58464124	69.98193366	68.57694851	176.7676218	153.020496	71.79054024
99	<i>P. anubis</i>	M	66.39110629	63.90897887	42.17790322	66.1182389	64.88252082	179.6781396	156.1516014	73.13628995
100	<i>P. anubis</i>	M	75.15233349	75.18812605		72.15480826	67.73471893	197.110601	164.8641585	76.08877722
101	<i>P. anubis</i>	M	64.49526612	62.79548523	48.59528272	70.9188504	67.06746769	175.364035	145.5158662	80.69734055
102	<i>P. anubis</i>	M	68.36754321	66.39632368	49.30174966	66.6089437	61.9965245	182.3245275	156.8234506	82.02527433
103	<i>P. anubis</i>	M	67.69638524	64.16114864	45.97675069	72.35709746	68.39160527	171.726777	149.5571077	74.80688701
104	<i>P. anubis</i>	M	66.11941655	64.85257849	52.14110312	65.11040044	64.22132705	180.7758692	154.1965013	84.54878554
105	<i>P. anubis</i>	M	69.12361953	64.8730779	50.53026769	65.48729129	72.14598167	148.8812395	131.1670999	52.32877652
106	<i>P. anubis</i>	M								45.95540958
107	<i>P. anubis</i>	M								64.54417652
108	<i>P. anubis</i>	M								54.34213242
109	<i>P. anubis</i>	M								60.92578981
110	<i>P. anubis</i>	M								50.22180993
111	<i>P. anubis</i>	M								64.60555853
112	<i>P. anubis</i>	M								61.03901516
113	<i>P. anubis</i>	M	66.17329943	65.1040208	49.76727676	71.19740634	71.64863235	173.3714666	156.7077559	51.98901793
114	<i>P. anubis</i>	M	66.06297146	63.27788737	48.72489056	73.96016188	78.06243396	169.5814803	140.1025441	60.87152073
115	<i>P. anubis</i>	M								68.62458825
116	<i>P. anubis</i>	M	65.55596769	61.73803744	53.73212985	64.34446525	72.58790281	135.8958788	114.3247042	48.75076102
117	<i>P. anubis</i>	M	66.15361589	64.49449435	48.73803781	71.13644	69.2685994	171.3643652	147.9477436	71.88835447
118	<i>P. anubis</i>	M	70.41645264	70.22308214	51.82556376	65.38180337	66.74179596	174.5005585	148.8425448	65.26275051
119	<i>P. anubis</i>	M	68.03616434	64.96088898	48.63213567	70.22681816	67.70201864	173.6866588	153.4571872	75.41234359
120	<i>P. anubis</i>	M	63.88998956	60.26179951	45.09702237	65.00476308	65.14944122	160.8692898	135.9919264	77.80303919
121	<i>P. anubis</i>	M	68.78959545	66.04553473	51.15169709	70.89670198	67.68147085	185.9246707	156.9688896	76.07953794
122	<i>P. anubis</i>	M	69.40857473	68.17887177	49.60942491	75.49655039	67.15850712	188.6984491	166.1200216	91.2600578
123	<i>P. anubis</i>	M	72.15116028	70.97217141	48.75620044	73.55679932		183.6453618	155.1650554	72.84424658
124	<i>P. anubis</i>	M	66.48519717	66.70673239	50.08250888	77.87454623	71.4392191	197.2849645	171.3530243	84.58042931
125	<i>P. anubis</i>	M	66.18471621	67.52939639	48.60733584	76.86958986	66.3960156	194.5610895	169.9963812	80.53841628
126	<i>P. anubis</i>	M	73.43405843	74.21613624	51.76421683	74.85012515	68.97843142	191.8974327	163.9102904	78.32745058
127	<i>P. anubis</i>	M	61.0933316	59.37154121	50.89253536	68.32154555	66.61908597	172.2957911	151.0584975	64.16229264
128	<i>P. anubis</i>	M	71.33203563	68.79642897	46.03127151	72.27030571	67.77719836	194.5052445	166.3817421	68.86340253
129	<i>P. anubis</i>	M	71.36198939	69.88911942	51.06259224	76.7418808	75.50370223	177.5570279	144.6827114	69.67422797
130	<i>P. anubis</i>	M	70.01576107	69.35699475	50.21555681	76.62259313	80.66320069	168.8765709	137.5205384	68.86408586
131	<i>P. anubis</i>	M	75.87036303	73.56722135	51.85011383	69.18385887	64.4415632	168.0608137	143.6539642	69.14188988
132	<i>P. anubis</i>	M	70.77330307	67.48553036	53.79166763	69.14248278	69.05422189	167.283253	142.1617595	72.17847045
133	<i>P. anubis</i>	M	67.27221419	64.9172171	50.43970068	69.35442025	67.78539543	148.8489441	132.6964864	67.18453103
134	<i>P. anubis</i>	M		76.60595276	58.87850657	77.50464056		174.8573579	145.4096905	54.75400469
135	<i>P. anubis</i>	M	70.74076067	69.62731978	50.9450407	71.21456173	66.37875509	192.6169262	161.183923	85.47642564
136	<i>P. anubis</i>	M	61.30028486	60.04784719	51.60515332	64.30212998	66.8709262	130.4139165	109.4576099	34.53058161
137	<i>P. anubis</i>	M	64.28629343	61.99455437	51.43493329	68.31410143	68.60663337	125.5870592	104.9186978	31.75135697
138	<i>P. anubis</i>	M								70.65757024
139	<i>P. anubis</i>	M	67.01894861	64.04684018	49.50201855	64.13737991	72.05258341	141.6161674	118.0280044	43.37189298
140	<i>P. anubis</i>	M	62.3441457	59.81634432	49.33363305	61.11691728	60.90275056	125.516299	110.2645232	43.73098488

	A	B	C	D	E	F	G	H	I	J
141	<i>P. anubis</i>	M	67.47056734	67.29348955	51.99594861	72.2370521	67.72310878	171.4412619	150.5671313	73.97916589
142	<i>P. anubis</i>	M	63.58072884	61.86363985	45.95404403	72.43513589	69.64599758	196.151323	158.9625348	86.13478127
143	<i>P. anubis</i>	M	67.59535003	65.27922192	48.66544905	70.08079336	67.75807835	182.1645205	160.5415205	73.50558042
144	<i>P. anubis</i>	M	68.25798872	64.08281282	40.67889663	67.23845825	66.81999498	175.100179	152.6229964	71.9360706
145	<i>P. anubis</i>	M	64.97161453	62.19952531	47.51472251	69.4245874		175.446907	154.1782008	70.56602712
146	<i>P. anubis</i>	M	61.00159411	59.90702186	46.34144897	68.19006395	67.61504886	178.0991358	149.0549042	77.68387134
147	<i>P. anubis</i>	M	67.8346537	67.81606744	49.6782496	72.74882058	68.66462352	191.9169407	162.5676936	84.99864848
148	<i>P. anubis</i>	M								77.30905027
149	<i>P. anubis</i>	M	72.05624408	71.29533248	47.8695049	74.60507718	67.72551021	181.1557776	157.7124055	78.59015836
150	<i>P. anubis</i>	M	69.81547709	68.25296802	49.82241236	74.51925831	75.56724057	188.7741386	163.6099954	79.22640924
151	<i>P. anubis</i>	M	73.62858957	70.64113803	46.5762286	77.69426585	69.61316607	203.0039004	173.2188991	70.5198166
152	<i>P. anubis</i>	M	70.99292262	68.25773371	46.65577406	68.80833186	67.63623431	188.7846491	160.0637881	76.68185574
153	<i>P. anubis</i>	M	66.84669647	64.30626504	44.95269933	70.39965531	67.08838373	180.4098801	150.7692143	78.10226939
154	<i>P. anubis</i>	M	70.86420057	68.65668	55.93093616	70.95599955	69.26867928	192.3799456	170.284725	79.00688423
155	<i>P. anubis</i>	M	71.01062741	69.86844814	57.56892835	71.26918637	68.26462228	173.8408269	150.1742196	79.31689188
156	<i>P. anubis</i>	M	65.98872327	62.88369035	43.80567356	69.10632072	66.44369844	189.5584759	165.745315	81.7436643
157	<i>P. anubis</i>	M	65.28998835	62.8112478	43.57367177	69.30991771	65.02098333	171.4915167	150.1396079	81.73464813
158	<i>P. anubis</i>	M	71.89930664	69.11326868	51.34190078	76.22590217	72.42495558	184.091113	162.1220611	82.17299318
159	<i>P. anubis</i>	M	66.00202548	63.76720062	45.07630667	69.16883267		172.2452772	144.9802843	78.67753543
160	<i>P. anubis</i>	M	75.6910526	72.6762599	50.66445942	71.80535499		196.7862315	165.7878238	82.83917713
161	<i>P. anubis</i>	M	72.22635086	71.59787867	52.66875916	79.29016294	78.26780557	185.6594838	164.7664573	69.00716244
162	<i>P. anubis</i>	M	70.15330106	66.7811502	46.32834572	75.98327364	73.15445018	179.3009468	149.1286167	78.19571574
163	<i>P. anubis</i>	M	65.40943612	63.39185034	47.44207217	74.2195545	72.33778223	175.2868162	151.8219655	81.34214477
164	<i>P. anubis</i>	M	73.49523172	70.79138137	52.04821612	71.07368817		205.7505028	176.2784937	82.2386141
165	<i>P. anubis</i>	M	74.85067717	72.72353778	50.79118187	78.34455013	76.46484163	200.1259091	168.8302132	73.47580995
166	<i>P. anubis</i>	M	68.93096373	65.57676494	48.4878593	72.78130019		189.7015727	168.6385082	80.24067101
167	<i>P. anubis</i>	M	69.47821331	67.3453984	44.28177869	76.5537952	70.26834227	180.607763	153.1864588	68.4841393
168	<i>P. anubis</i>	M	68.07993379	66.21948145	46.80064102	69.93244816	66.91907832	179.832901		73.30798279
169	<i>P. anubis</i>	M	63.05235203	61.50803095	49.76467531	67.73261926	67.07388255	169.7391893	142.1416611	52.8411827
170	<i>P. anubis</i>	M	70.91795951	69.15979362	51.98832495	75.48020496	69.04486911	191.5679114	166.2251961	78.90110637
171	<i>P. anubis</i>	M	69.26852934	67.31665188	46.49649689	74.52366357	66.26606936	191.9497169	165.617648	
172	<i>P. anubis</i>	M	71.73673249	70.31800816	49.50311743	71.38900137	67.34544626	198.1385831	166.0366993	69.99088958
173	<i>P. anubis</i>	M	62.32880142	59.79021444	47.11941294	66.4567475	66.48554112	163.8438708	141.4012024	75.62461628
174	<i>P. anubis</i>	M	74.51310151	72.50176344	51.93413027	65.21161536	64.29796038	172.5659974	154.6458565	77.69583238
175	<i>P. anubis</i>	M								74.17585931
176	<i>P. anubis</i>	M	72.45036397	69.13920848	54.55649069	72.20754248	69.92189296	149.9682691	124.4978769	66.36779397
177	<i>P. anubis</i>	M	64.6582741	61.94114151	47.81726891	69.9382648	69.63738514	165.903316	145.8279806	71.83125339
178	<i>P. anubis</i>	M	68.47631298	63.92950591	46.22042632	69.86534389	73.61324974	178.569372	152.6652271	72.13503023
179	<i>P. anubis</i>	M	58.14834539	54.41393919	51.83986902	72.61129256	75.90034064	164.997167	147.2231637	82.28344336
180	<i>P. anubis</i>	M	61.60605716	58.58422119	43.14594817	70.4829135	73.9429409	166.2323455	142.7689984	72.87966031
181	<i>P. anubis</i>	M	63.84001648	61.81644788	48.93129516	68.48798179	71.71969063	155.0028421	135.025728	68.46213392
182	<i>P. anubis</i>	M	65.89177286	62.45300446	50.06207369	68.64074989	66.74128225	173.120408	145.1675579	77.47587502
183	<i>P. anubis</i>	M	66.49675926	63.55052848	54.3814733	72.88252178	71.57169982	179.560185	152.8693391	63.74174187
184	<i>P. anubis</i>	M	67.02849475	68.80218642	51.11796851	76.31076839		156.8752327	132.4698082	72.69870971
185	<i>P. anubis</i>	M	66.51371029	62.99001855	49.13933094	70.08102253	67.97253834	171.3390125	143.8481943	65.40819488
186	<i>P. anubis</i>	M	64.983647	64.90295748	52.57716684	72.93769294		169.7245642	142.0134877	61.99397832
187	<i>P. anubis</i>	M	68.26866004	66.76041259	47.90290054	71.56564736	77.335138	164.2844601	143.1819151	50.55086935

	A	B	C	D	E	F	G	H	I	J
188	<i>P. anubis</i>	M	62.92097539	62.12316331	43.68031713	68.11574492	66.33551785	168.4153479	144.4977106	67.43075698
189	<i>P. anubis</i>	M	66.95751339	64.04530272	47.8697359	69.5484885	68.83572988	162.6791747	144.8900571	71.61914965
190	<i>P. anubis</i>	M	69.34286781	65.17965998	53.89710913	70.44467692	79.44769233	147.7998131	122.5104348	47.16713475
191	<i>P. anubis</i>	M	75.6033223	72.73280938	53.33444354	71.32853268	75.82471609	161.5611518	134.1615597	56.31379426
192	<i>P. anubis</i>	M	76.76411759	72.51951999	51.89609877	83.72234002		174.554197	143.0220135	57.36451544
193	<i>P. anubis</i>	M	70.48898327	68.69290584	56.80899862	81.09561155		168.0199463	131.865855	68.04996144
194	<i>P. anubis</i>	M	72.57490295	71.63942829	54.35374781	84.58093292		170.5228605	130.4937359	75.49068072
195	<i>P. anubis</i>	M	62.21044012	60.38497163	52.79366443	69.04289068	64.27457623	163.4702719	134.5800895	70.22067408
196	<i>P. anubis</i>	M	60.49288509	59.99863384	45.06743879	63.34788137	63.14306814	173.9996039	146.6729831	74.35786923
197	<i>P. anubis</i>	M	74.87858854	72.92166024	50.57793414	75.30486265	70.86272088	192.5763321	167.7021771	80.57135745
198	<i>P. anubis</i> male	N=109								
199	MEAN		68.22598631	66.17204477	49.43978625	71.48070241	69.49342794	174.5358243	148.9132911	70.12467343
200	SD		3.990051486	4.229924968	3.45353038	4.258505114	3.909170061	17.81520618	15.99682464	11.84866658
201	MINIMUM		58.14834539	54.41393919	40.42005229	61.11691728	60.90275056	116.9176748	98.91656905	31.75135697
202	MAXIMUM		76.76411759	76.60595276	58.87850657	84.58093292	80.66320069	205.7505028	176.2784937	91.2600578
203										
204	<i>P. cynocephalus</i>	F	69.31398622	66.13514733	51.0811424	63.23018425	67.97734606	151.3056874	128.5394152	61.58839389
205	<i>P. cynocephalus</i>	F	63.82305025	62.30038429	47.11912557	67.56731776	69.39391913	159.7115835	141.773352	57.97498704
206	<i>P. cynocephalus</i>	F	68.49086673	66.08264656	49.75112351	70.58332294	75.45236405	159.9866978	132.0625265	59.3356289
207	<i>P. cynocephalus</i>	F	71.96911904	68.85398741	53.83993168	75.38913592	78.75139101	162.0075209	134.209387	57.87566918
208	<i>P. cynocephalus</i>	F	66.08448825	63.97136047	48.82666828	69.86306903	76.00875799	156.2862273	129.5374754	49.93287722
209	<i>P. cynocephalus</i>	F	66.90348938	63.00289324	50.82500902	69.99241183	69.7682884	169.5862405	149.5573618	62.96872797
210	<i>P. cynocephalus</i>	F	65.84617471	62.52465775	47.12669673	67.87778603	69.33161684	158.2730325	139.4029254	65.28634789
211	<i>P. cynocephalus</i>	F	62.73928719	60.21370162	48.44004814	68.72236186	69.80878839	164.3570544	146.040175	64.01073622
212	<i>P. cynocephalus</i>	F	69.84339327	68.11761566	48.84402025	69.07875713	71.92880697	164.9679624	142.5360841	59.02017056
213	<i>P. cynocephalus</i>	F	65.88337422	64.0994996	46.6176404	67.04463772	64.59532682	165.1238524	142.645554	66.55551357
214	<i>P. cynocephalus</i>	F	72.24365683	70.09700757	45.72820259	70.14518533	74.57155084	153.0299395	131.6520553	56.72354486
215	<i>P. cynocephalus</i>	F	64.39143667	61.35443375	47.92289827	67.00417473	65.92405255	160.9495452	140.4476337	63.38896585
216	<i>P. cynocephalus</i>	F	64.53728515	62.45066897	51.63859267	63.24573716	63.57271811	162.949036	140.8212264	66.60481014
217	<i>P. cynocephalus</i>	F	64.93450118	60.58773423	46.11680368	65.82864508	64.63220659	168.7215441	146.2824147	71.92249162
218	<i>P. cynocephalus</i>	F	61.60404252	58.99260572	46.90062273	66.30845446	68.54920354	152.9038522	136.0225003	61.08339857
219	<i>P. cynocephalus</i>	F	62.5566614	59.85051401	48.53406657	69.18052634	65.44664975	164.7054701	141.6542833	67.77930389
220	<i>P. cynocephalus</i>	F	62.47243769	61.62229624	45.61044789	67.87048531	67.97410678	153.5298673	135.3454292	66.80681405
221	<i>P. cynocephalus</i>	F	66.06579835	62.20889652	52.09984097	70.89818724	76.23624304	162.808799	139.0916258	61.08596893
222	<i>P. cynocephalus</i>	F	65.37946237	63.54668388	49.02055462	67.54789667	62.68031078	157.7966801	135.8182735	63.1759291
223	<i>P. cynocephalus</i>	F	73.44042877	68.18557948	53.00647027	73.44574068	77.19907152	172.8976938	147.2964215	58.78039054
224	<i>P. cynocephalus</i>	F	73.19685168	70.08485755	51.73558194	73.89787214	75.18655108	171.5741774	150.4101108	60.18049132
225	<i>P. cynocephalus</i>	F	66.98803904	64.05195161	44.55569643	71.04991196	63.71951724	178.1729168	158.0887659	75.39178829
226	<i>P. cynocephalus</i>	F	66.25411219	64.15378363	51.73966072	68.67725114	67.04152758	155.6299826	138.7605466	58.5819851
227	<i>P. cynocephalus</i>	F	66.64663757	63.68030507	50.80727497	63.01657037	63.78228091	162.5754566	138.1523001	65.80652335
228	<i>P. cynocephalus</i>	F	77.40492254	74.26904273	58.15668921	78.35981976	88.94190895	164.6086038	139.90327	57.67951153
229	<i>P. cynocephalus</i>	F	63.48793188	59.83072133	42.84815086	63.13739254	62.0667648	167.209737	143.277492	65.4885332
230	<i>P. cynocephalus</i>	F	62.86126563	60.25923268	46.76344091	69.45810098	66.00735019	152.1698365	135.5361899	63.09907526
231	<i>P. cynocephalus</i>	F	63.35979411	60.84050463	46.32951218	68.06785433	64.35760484	170.8707171	152.4222846	70.23714085
232	<i>P. cynocephalus</i>	F	65.08715769	61.70543846	48.82227445	66.50407197	65.00844656	159.1117575	138.2275529	63.46103267
233	<i>P. cynocephalus</i>	F	65.58037848	63.59825473	46.35749585	65.94049102	66.88515249	172.3026671	149.2417185	73.41993623
234	<i>P. cynocephalus</i>	F	64.45260093	61.94498622	49.47841607	69.69258032	63.94255581	166.48929	143.5506616	64.30009902

	A	B	C	D	E	F	G	H	I	J
235	<i>P. cynocephalus</i>	F	66.80395202	65.10382356	50.34983678	67.34136491	65.06972272	169.7915343	147.1741118	67.86953956
236	<i>P. cynocephalus</i>	F	70.54371089	68.72726994	47.55000718	65.3760067	65.69013452	171.6076677	148.3041455	63.49742323
237	<i>P. cynocephalus</i>	F	75.88640767	75.08664303	56.0124292	78.73879507	89.12120976	159.4214051	130.1105573	50.27902256
238	<i>P. cynocephalus</i>	F	72.73259284	70.78762854	52.6258415	74.82932034	83.81081781	164.8672144	137.9341998	57.37771259
239	<i>P. cynocephalus</i>	F	72.11443617	68.63488262	48.80416795	67.35184983	73.70556547	162.100897	139.8710477	59.51671462
240	<i>P. cynocephalus</i>	F	68.66119694	66.18493004	49.54780307	67.69293304	73.99332213	164.1980519	137.4090895	60.69332043
241	<i>P. cynocephalus</i>	F	70.21432725	69.05087496	48.74533272	70.43475598	69.01097484	196.1132768	177.1647495	81.82871294
242	<i>P. cynocephalus</i>	F	62.24377459	59.59436098	43.87199511	63.33837535	63.27767708	155.3951963	133.4799199	67.04171931
243	<i>P. cynocephalus</i>	F	68.14951296	65.11474898	50.13968478	69.49588314	76.48968467	170.5354234	146.3283645	63.2378692
244	<i>P. cynocephalus</i>	F	68.94600873	65.82839632	50.16892761	65.50141759	64.63895656	164.2991796	145.0404957	61.79918937
245	<i>P. cynocephalus</i>	F	68.15847862	67.75079429	53.06370417	73.12531762	73.95831973	172.1678916	142.1987091	74.4575979
246	<i>P. cynocephalus</i>	F	67.63120667	64.79447038	43.90218748	65.26064432	68.49851954	145.953004	120.7137198	54.74208133
247	<i>P. cynocephalus</i>	F	64.94067146	64.8354292	48.7259439	71.74735646	67.6598006	152.5451539	126.3352398	63.2879867
248	<i>P. cynocephalus</i>	F	63.84125194	61.87245521	46.1647124	63.58300857	62.99212706	146.4814692	127.1950939	63.53819525
249	<i>P. cynocephalus</i>	F	69.02251697	67.14583894	52.96058872	71.55550523	73.87802011	169.6096216	142.2509845	64.29666836
250	<i>P. cynocephalus</i>	F	71.64830022	70.90283767	51.9962245	71.9117387	72.13990817	220.1439159	194.2506634	80.50364464
251	<i>P. cynocephalus</i>	F	67.94358347	65.32445376	50.9573886	71.87735201	71.65519606	157.0682839	132.6170664	59.50227504
252	<i>P. cynocephalus</i>	F	67.14659385	64.22295276	49.72693178	67.27506944	65.47583579	164.2774463	141.1460769	61.64007413
253	<i>P. cynocephalus</i>	F	67.81369956	65.04276918	47.39827179	68.33101976	75.03731738	157.2977607	138.7865805	55.98090226
254	<i>P. cynocephalus</i>	F	77.14325627	73.33252654	55.8317498	70.08304432	70.7216079	180.1230731	159.7494868	58.31594421
255	<i>P. cynocephalus</i>	F	70.8988722	69.13561505	52.99894963	71.353983	73.87508198	165.8895066	145.4200073	61.32513613
256	<i>P. cynocephalus</i>	F	69.77538562	66.56510943	51.94352167	69.04216579	65.16970584	161.5035861	136.4489725	64.45489105
257	<i>P. cynocephalus</i>	F	65.75016955	62.56099104	46.57442956	68.07616457	72.82738172	169.5901272	144.8998816	66.75891828
258	<i>P. cynocephalus</i>	F	67.35031187	64.60732961	49.44745421	68.20100395	71.4197807	153.6331837	129.8214592	55.03719824
259	<i>P. cynocephalus</i>	F	77.63023733	77.77362644	56.61288439	81.35866949	86.86901339	182.6662006	153.2124293	59.14818204
260	<i>P. cynocephalus</i>	F	72.1677451	69.76984223	52.87542577	77.66649784	81.87303199	169.2749184	135.9880646	63.44785315
261	<i>P. cynocephalus</i>	F	74.48909551	73.41786166	48.46535631	71.58893028	70.62079778	201.891356	175.3985945	86.12301299
262	<i>P. cynocephalus</i>	F	77.01424519	74.24977992	50.24207814	79.67769386	87.70133235	182.6217229	151.1360514	67.97706737
263	<i>P. cynocephalus</i>	F	65.19516629	63.07185267	52.72787504	68.8172086	68.87390007	138.8600831	117.7222382	38.87019254
264	<i>P. cynocephalus</i>	F	72.81740455	71.43073372	55.95272842	72.68583515	73.81076416	159.4325689	135.6860165	49.78842093
265	<i>P. cynocephalus</i>	F	69.60574094	66.61078146	51.13351134	70.42032479	66.94969687	166.987178	143.1668371	64.72373887
266	<i>P. cynocephalus</i>	F	70.56068602	68.19483988	47.60885919	72.82043977	73.56103904	166.7422742	149.2503794	65.76639582
267	<i>P. cynocephalus</i>	F	64.75501672	62.04491752	48.74034256	66.15803711	68.09354769	162.8752126	137.8873681	58.68178669
268	<i>P. cynocephalus</i>	F	72.78526333	71.04393004	55.33991218	83.07994264		158.9202736	128.370954	52.34251774
269	<i>P. cynocephalus</i> females	N=65								
270	MEAN		68.24959156	65.82204139	49.7823255	69.76036291	70.86269017	165.0384475	141.8581011	62.82151834
271	SD		4.117396307	4.323972899	3.288154495	4.361336895	6.645638619	12.51473955	12.20600271	7.508581764
272	MINIMUM		61.60404252	58.99260572	42.84815086	63.01657037	62.0667648	138.8600831	117.7222382	38.87019254
273	MAXIMUM		77.63023733	77.77362644	58.15668921	83.07994264	89.12120976	220.1439159	194.2506634	86.12301299
274										
275	<i>P. cynocephalus</i>	M	63.18510187	59.31038951		62.67750285	64.04329256	143.2244323	126.8882711	52.38595846
276	<i>P. cynocephalus</i>	M	68.46790744	66.33292145	51.92684943	65.84579418	66.97844441	171.174849	148.8600186	65.83748719
277	<i>P. cynocephalus</i>	M	61.25125924	59.60628528	48.21303872	57.46583099	59.66188735	127.531064	115.2591478	37.58770176
278	<i>P. cynocephalus</i>	M	72.13954299	69.82725513	54.06836756	65.60213314	68.02829485	186.2391525	164.6044001	70.23870983
279	<i>P. cynocephalus</i>	M	67.3606927	65.44365483	49.60846393	63.98250944	64.25158815	161.3977582	141.2415728	65.37853395
280	<i>P. cynocephalus</i>	M	66.71118219	66.00661484	58.18555268	67.99987071	65.42868698	164.8748283	136.5519214	62.74387915
281	<i>P. cynocephalus</i>	M	65.08589429	62.71460757	46.76782015	70.84373164	68.55291504	175.4558858	146.6918075	71.08131449

	A	B	C	D	E	F	G	H	I	J
282	<i>P. cynocephalus</i>	M	66.76896956	65.96169871	48.23647641	66.21892015	66.61151943	150.9515295	131.4927816	52.58664193
283	<i>P. cynocephalus</i>	M	69.5252947	67.28229873	49.80192385	69.71283524	73.2299095	151.0624621	132.9510966	46.04442964
284	<i>P. cynocephalus</i>	M	70.49884632	68.1703316	55.17821457	70.40841141	74.84801434	164.9045283	142.4057075	57.90091008
285	<i>P. cynocephalus</i>	M	68.61170444	65.22254223	44.44229224	69.93413903	72.66569773	165.5040587	137.6155291	68.13762596
286	<i>P. cynocephalus</i>	M	64.22586146	62.90159904	52.4334461	68.43344766	74.59651224	170.3373195	149.6668319	54.31813214
287	<i>P. cynocephalus</i>	M	63.72002716	61.65996219	49.66107389	73.92650747	73.07282368	174.3281137	150.9361033	72.92288441
288	<i>P. cynocephalus</i>	M	67.90426983	66.61917492	53.33901477	68.53393618	67.57968031	169.6368163	146.4107759	57.71833657
289	<i>P. cynocephalus</i>	M	60.13866304	56.96901191	46.94764828	65.44788985	59.69382991	162.2201632	145.4216176	70.25298581
290	<i>P. cynocephalus</i>	M	65.34551772	62.43967462	46.2416816	70.43549498	68.28882011	169.6479788	145.0617113	73.72868588
291	<i>P. cynocephalus</i>	M	66.01025727	62.73798025	49.32554588	68.53755231	64.22330593	183.0795784	158.9747105	68.85740615
292	<i>P. cynocephalus</i>	M	65.55437442	64.43788537	45.38306849	69.08096944	62.12717995	151.9109608	134.8084255	61.79692323
293	<i>P. cynocephalus</i>	M	60.29312888	56.56312587	45.3501955	64.38738771	58.38735984	157.2804628	137.8699244	60.0713513
294	<i>P. cynocephalus</i>	M	63.05613668	61.06050174	49.45737563	65.09656438	61.28710272	152.7486397	135.5206065	66.61414976
295	<i>P. cynocephalus</i>	M	73.70246862	71.74806371	50.89071751	80.1857282	87.74438511	174.6959368	143.0514047	57.91907649
296	<i>P. cynocephalus</i>	M	66.34702155	66.86812294	51.39642225	72.02484124	68.43223949	162.129665	140.1442374	69.22399335
297	<i>P. cynocephalus</i>	M	68.21258942	66.65867258	47.32434902	70.86072156	66.46030733	174.0086325	153.3100266	74.69630278
298	<i>P. cynocephalus</i>	M	72.75474103	70.60836567	55.24406804	73.01799755	70.79635103	170.3133745	139.3010203	71.59476473
299	<i>P. cynocephalus</i>	M	54.90145264	51.53528577	43.08741751	61.44198535	57.11237774	129.9870666	114.4570069	52.10190432
300	<i>P. cynocephalus</i>	M	69.34698467	66.15496797	51.928923	70.08450195	66.68968727	163.2693966	143.1380148	65.48733301
301	<i>P. cynocephalus</i>	M	66.9233041	64.40973538	50.38289886	64.38141814	65.82352708	166.2452607	146.2913099	68.70666533
302	<i>P. cynocephalus</i>	M	66.9356906	65.62314768	45.10661343	68.42960885	67.66807382	176.5993946	147.9223803	65.05937633
303	<i>P. cynocephalus</i>	M	65.56343618	63.49103749	52.48208189	76.05069101	72.86617701	149.3171542	123.6135434	56.69584744
304	<i>P. cynocephalus</i>	M	69.39736122	68.00733762	51.09643535	69.37428683	68.70677936	171.9707785	151.3119864	63.72171402
305	<i>P. cynocephalus</i>	M	67.4848738	64.49356084	53.15761505	70.93992253	65.39237002	161.255263	138.0867689	64.02646358
306	<i>P. cynocephalus</i>	M	71.95734189	68.49803347	51.67121473	70.44137363	76.01260199	159.7610522	139.4462063	61.23090003
307	<i>P. cynocephalus</i>	M	66.17631869	63.11895074	46.68826864	73.10100171	66.54898454	170.0270088	146.7959704	76.09048721
308	<i>P. cynocephalus</i>	M	69.64560188	66.12255695	52.16076942	69.39522753	63.66965781	167.8352027	146.7504066	73.08636282
309	<i>P. cynocephalus</i>	M	64.348414	62.08106155	52.25270409	71.58264743	64.71379648	173.7593961	150.1334777	71.00868244
310	<i>P. cynocephalus</i>	M	68.54082856	66.56576833	52.86652268	68.84992562	73.1822185	159.775095	142.066497	57.31525856
311	<i>P. cynocephalus</i>	M	72.45091642	70.76725815	56.03507995	72.17409816	78.58563348	171.8874634	149.9944996	64.40785245
312	<i>P. cynocephalus</i>	M	65.5723465	63.06972762	48.48209051	68.12541634	69.65878266	174.9876079	157.0930147	68.083413
313	<i>P. cynocephalus</i>	M	63.19109884	61.64711479	44.13074033	64.65207596	60.17005282	168.5223245	147.7792085	71.08082831
314	<i>P. cynocephalus</i>	M	67.36701161	63.72532976	43.31080672	65.67661898	64.04024829	182.6085951	162.8833064	77.67575318
315	<i>P. cynocephalus</i>	M	66.91663484	64.02754515	42.03571118	68.26637291	77.52125857	158.1947805	136.9553087	58.84837602
316	<i>P. cynocephalus</i>	M	78.91542381	74.0714414	53.09717732	78.74677993	89.62929652	162.9225268	135.9762081	63.47522577
317	<i>P. cynocephalus</i>	M	74.3637431	72.87921003	49.52552824	69.31643842	78.4442339	190.8362157	159.3764617	65.49187457
318	<i>P. cynocephalus</i>	M	74.32819207	72.1275292	54.82286662	72.65776083	69.00460358	187.495379	160.4522794	67.65865847
319	<i>P. cynocephalus</i>	M	67.85595892	65.11392196	52.83332976	73.10955615	66.07749602	176.5739866	154.7956702	71.39135431
320	<i>P. cynocephalus</i>	M	63.18264114	60.75377783	48.85651261	68.58047997	65.95030356	166.8101559	150.4645277	73.32292357
321	<i>P. cynocephalus</i>	M	64.2002224	61.83659763	47.44655441	61.79988631	58.36766777	155.4785046	136.0303975	71.67556672
322	<i>P. cynocephalus</i>	M	81.13765075	77.21303119	59.75333067	66.93883319	80.30657048	136.2400841	107.1498334	32.06330809
323	<i>P. cynocephalus</i>	M	75.08524104	72.89459778	59.97992035	76.13584393	89.16054125	157.5721312	134.2038229	52.1068558
324	<i>P. cynocephalus</i>	M	81.25554523	79.34820733	58.84960509	82.18332757	88.28171191	187.0130216	153.952396	67.02846098
325	<i>P. cynocephalus</i>	M	76.14832557	72.35566016	60.8370119	72.87148275	84.53433624	149.9763968	124.9354817	54.94346357
326	<i>P. cynocephalus</i>	M	78.30107263	76.58767768	61.22234102	77.56160805	86.68941633	176.9108499	150.9887601	62.96372004
327	<i>P. cynocephalus</i>	M	79.27846239	75.26505602	61.00702728	77.36592493	88.43698113	157.5106782	128.6814733	51.76325637
328	<i>P. cynocephalus</i>	M	77.42801675	73.92753864	51.19337379	68.96302582	75.4192446	170.6392911	153.62335	60.58322857

	A	B	C	D	E	F	G	H	I	J
329	<i>P. cynocephalus</i>	M	65.5834068	62.46475207	47.25853882	71.14654372	76.08441377	176.2205508	151.841173	63.01882813
330	<i>P. cynocephalus</i>	M	72.50810364	68.65701586	49.55758312	70.9927067	75.70207178	169.857631	142.9838221	60.92132773
331	<i>P. cynocephalus</i>	M	66.06127739	63.06476547	46.69489544	64.01785846	61.72981564	170.098605	152.1032723	72.56830459
332	<i>P. cynocephalus</i>	M	68.5113907	65.58685819	49.40309852	68.67481496	73.17699643	166.1267179	140.4825276	65.11003577
333	<i>P. cynocephalus</i>	M	64.54152789	60.21929922	43.94279019	68.33227091	68.04170026	179.0679588	157.0497422	70.9241023
334	<i>P. cynocephalus</i>	M	63.86994343	60.88225417	45.83297077	68.12201337	64.20422885	170.9571715	146.1798834	68.78483762
335	<i>P. cynocephalus</i>	M	63.57798546	61.86943523	50.34681091	69.75899621	65.41549239	143.3964951	123.2635318	55.09066049
336	<i>P. cynocephalus</i>	M	67.6515248	65.87661815	52.45584406	70.90471936	76.02922312	172.6970376	150.4187857	61.49768637
337	<i>P. cynocephalus</i>	M	64.83657335	61.71992646	47.45790356	67.37498301	66.94546293	170.0281609	145.9659049	64.15734001
338	<i>P. cynocephalus</i>	M	77.86395316	77.25502751	56.42389701	83.53380725	88.79781676	162.872726	127.1428629	52.93388045
339	<i>P. cynocephalus</i>	M	72.90723376	68.85288417	48.38483607	82.68935741	83.81963074	172.3912638	134.5276686	52.61550361
340	<i>P. cynocephalus</i>	M	66.2309594	64.0107159	48.67876831	66.4804925	66.3426912	178.5599058	159.9288728	73.64927703
341	<i>P. cynocephalus</i>	M	72.30800822	68.80853421	55.82429919	82.95175441	89.05162056	169.8668941	130.5963087	62.66866208
342	<i>P. cynocephalus</i>	M	57.76725294	58.39070741	38.18371091	60.61460356	60.23693013	161.1123835	137.7494342	65.16858992
343	<i>P. cynocephalus</i>	M	68.56151766	66.34467684	49.14951244	66.99654833	70.62038782	156.5803917	133.059523	60.27818897
344	<i>P. cynocephalus</i>	M								51.48237183
345	<i>P. cynocephalus</i>	M	63.55890158	61.96893081	48.9682212	71.16685383	68.53726538	155.8298189	135.522801	65.37207805
346	<i>P. cynocephalus</i>	M	65.60674196	63.54180416	48.52308692	68.87788444	65.71634273	169.1699653	148.328218	67.55396149
347	<i>P. cynocephalus</i>	M	66.94495614	64.19450496	46.17276805	64.30463603	72.45113929	133.2459574	110.4826949	46.5829764
348	<i>P. cynocephalus</i>	M	66.26964152	63.10561416	50.05127656	69.34771527	75.48010519	155.7595268	133.1689233	56.98795222
349	<i>P. cynocephalus</i>	M	72.11639567	71.01980512	46.0823788	70.36796532	71.67798424	159.5551799	136.0675807	54.92489811
350	<i>P. cynocephalus</i>	M	72.13982272	70.29708415	52.521634	70.97289522	72.68184582	179.4966709	153.9304914	72.10220592
351	<i>P. cynocephalus</i>	M	63.00694952	61.43448243	50.74290778	67.68979694	69.4072274	151.3849854	129.6663637	51.57369152
352	<i>P. cynocephalus</i>	M	67.71734704	63.8807217	50.91276673	66.35569397	68.62160227	167.0197441	142.1797047	65.4352721
353	<i>P. cynocephalus</i> male	N=78								
354	MEAN		68.24951922	65.82220552	50.38545498	69.76017856	70.86268537	165.0381298	141.8575235	62.82225555
355	SD		5.22526602	5.148309107	4.637255993	5.056175422	8.301294108	12.81869113	11.96779547	8.720385087
356	MINIMUM		54.90145264	51.53528577	38.18371091	57.46583099	57.11237774	127.531064	107.1498334	32.06330809
357	MAXIMUM		81.25554523	79.34820733	61.22234102	83.53380725	89.62929652	190.8362157	164.6044001	77.67575318
358										
359	<i>P. cynocephalus (kindae)</i>	F	59.71422698	58.36513402	49.74040399	64.13019932	65.04357043		111.0833385	42.06784627
360	<i>P. cynocephalus (kindae)</i>	F	57.23088441	56.51777728	48.30461294	61.15924231	61.1133758	112.8841093	93.27074824	41.16431503
361	<i>P. cynocephalus (kindae)</i>	F	61.10586241		50.12729206	63.86295856	65.82616867	110.4648847	85.61671389	34.01027808
362	<i>P. cynocephalus (kindae)</i>	F	61.4871039	58.92588692	49.02961218	60.71181485		117.6869643	96.26695936	34.72149929
363	<i>P. cynocephalus (kindae)</i>	F	61.79264594	59.28244326	42.55177705	64.29925532	67.26080688	130.1761426	108.7136987	51.52701534
364	<i>P. cynocephalus (kindae)</i>	F	59.67874877	57.39922142	51.63777912	59.76480969		118.5078108	94.59452388	40.53638952
365	<i>P. cynocephalus (kindae)</i>	F	60.61059614	57.92449145		63.3839675	67.05974689		88.96538509	34.78547728
366	<i>P. cynocephalus (kindae)</i>	F	57.90037481	55.97296946	49.85298618	58.12140019		116.6817112	100.2546811	34.06510833
367	<i>P. cynocephalus (kindae)</i>	F	62.97857512	62.28934641	50.07116867	65.37040615		137.1942423	112.9925065	45.09435965
368	<i>P. cynocephalus (kindae)</i>	F	60.85622701	59.82157326	47.87981591	61.04524233		127.5501407	107.797932	45.53784534
369	<i>P. cynocephalus (kindae)</i>	F	60.62665428	59.08643611	52.46211299	62.05650033	64.30519625	114.3487004	95.70717084	39.80922592
370	<i>P. cynocephalus (kindae)</i>	F	62.91413157	59.13085015	50.72786746	61.16525856			94.02191132	38.56685513
371	<i>P. cynocephalus (kindae)</i>	F	65.11076016	61.60502229	54.79481664	62.51830777	66.166445	111.4936163	82.69677249	30.85426086
372	<i>P. cynocephalus (kindae)</i>	F	66.66378516	64.63043358	58.68786586	66.84880622	70.71070108	116.3666255	94.10718152	39.7062585
373	<i>P. cynocephalus (kindae)</i>	F	66.44430514	62.94908946	48.89458338	62.68482677		113.6140262	91.59924319	34.87793025
374	<i>P. cynocephalus (kindae)</i>	F	63.68771307	61.98226158	52.82076563	61.24694639	65.2992684	125.8921858	101.3487931	37.87977752
375	<i>P. cynocephalus (kindae)</i>	F	65.99125197	62.34297638		60.49251149	65.15199996	117.7993783		39.07052862

	A	B	C	D	E	F	G	H	I	J
376	<i>P. cynocephalus (kindae)</i>	F	65.61886925		50.87508092	62.06703389	64.90815645		99.60854919	
377	<i>P. cynocephalus (kindae)</i>	F	63.19179931	61.82653997	49.05887396	63.2191037	69.15409931	113.8574031	88.43712031	34.25285405
378	<i>P. cynocephalus (kindae)</i>	F	62.95318113	58.82822826	50.64154669	61.36116776	66.51569434	125.2564484	99.05751666	34.08119307
379	<i>P. cynocephalus (kindae)</i>	F	66.43814962	64.65446231	55.76167182	69.55472796			100.4815152	43.41076536
380	<i>P. cynocephalus (kindae)</i>	F	65.44533984	63.1021808	51.9436147	69.02355361	69.41067915	131.309519	112.1951451	40.91668724
381	<i>P. cynocephalus (kindae)</i>	F	65.49160409	62.78321686	51.26390248	67.03614841	67.76484476	142.5199836	117.4796658	51.04992387
382	<i>P. cynocephalus (kindae)</i>	F	59.25037991	57.25425495	50.11026068	61.2611754	64.22004142	120.7344909	102.8969161	35.40859976
383	<i>P. cynocephalus (kindae)</i>	F	63.98478036	61.65258508	52.50099835	61.41105785	62.93210964	118.7349321	94.90350643	35.648682
384	<i>P. cynocephalus (kindae)</i>	F	66.67706936	65.81498065	53.32359139	65.80802107	64.96324601	147.2391957	125.1114504	47.80060654
385	<i>P. cynocephalus (kindae)</i>	F	63.95925578	62.25317793	50.64933983	65.63546199				42.88885616
386	<i>P. kindae female</i>	N=27								
387	MEAN		62.88163983	60.65582159	50.94849364	63.15703353	65.98923058	122.3958339	99.9683578	39.60512073
388	SD		2.798052455	2.699564664	3.004847387	2.799767092	2.347018826	10.33965879	10.32870393	5.465430553
389	MINIMUM		57.23088441	55.97296946	42.55177705	58.12140019	61.1133758	110.4648847	82.69677249	30.85426086
390	MAXIMUM		66.67706936	65.81498065	58.68786586	69.55472796	70.71070108	147.2391957	125.1114504	51.52701534
391										
392	<i>P. cynocephalus (kindae)</i>	M	64.1666344	61.36887331	48.319228	60.29277449	65.13740969	132.7842863	111.8788453	39.11471129
393	<i>P. cynocephalus (kindae)</i>	M	65.85560841	62.05499517	50.30297991					35.91247092
394	<i>P. cynocephalus (kindae)</i>	M	60.85259534	59.9455439						35.98221092
395	<i>P. cynocephalus (kindae)</i>	M								47.13309235
396	<i>P. cynocephalus (kindae)</i>	M	57.20875011	56.73778836	49.92720053	56.26790203		119.2306827	104.9711143	42.21319068
397	<i>P. cynocephalus (kindae)</i>	M	66.2683422			62.75963945		134.0353515	111.2730858	43.17134957
398	<i>P. cynocephalus (kindae)</i>	M								39.94014993
399	<i>P. cynocephalus (kindae)</i>	M	70.48416139	69.33604967	55.64821561	68.25787852	73.18743095	126.1676918	95.13814913	34.54968507
400	<i>P. cynocephalus (kindae)</i>	M	65.36264653	63.56053368	54.84704511	68.61744552	71.99860381	122.5673657	99.67353179	39.50212073
401	<i>P. cynocephalus (kindae)</i>	M	65.95121333	63.1755823	51.88102283	61.90423401	62.1412061	123.798421	102.5466788	45.52540801
402	<i>P. cynocephalus (kindae)</i>	M	61.79087552	59.34279853	50.59116723	63.6012674	64.4224908	116.6032434	90.11331037	40.63219558
403	<i>P. cynocephalus (kindae)</i>	M	55.6104736	54.13684568	50.45658887	64.34667845	65.67610671	108.3836802	87.05986076	26.63063052
404	<i>P. cynocephalus (kindae)</i>	M	60.56318479	59.02035596	48.30508328	58.7907166	61.04220145	110.9781697	89.71558656	39.937619
405	<i>P. cynocephalus (kindae)</i>	M	60.46653777	58.53715197	49.204769	66.73006979	64.30448066	129.4144418	107.3143178	44.22102326
406	<i>P. kindae male</i>	N=14								
407	MEAN		62.88175195	60.65604714	50.94833004	63.15686063	65.98874127	122.3963334	99.96844806	39.60470413
408	SD		4.230922303	3.99798823	2.514984258	4.036915353	4.364200859	8.686890165	9.113990705	5.223699586
409	MINIMUM		55.6104736	54.13684568	48.30508328	56.26790203	61.04220145	108.3836802	87.05986076	26.63063052
410	MAXIMUM		70.48416139	69.33604967	55.64821561	68.61744552	73.18743095	134.0353515	111.8788453	47.13309235
411										
412	<i>P. hamadryas</i>	F	62.69031818	60.96561651	46.57009187	63.93627232	63.15722016	143.7028826	122.9225208	56.13766876
413	<i>P. hamadryas female</i>	N=1								
414	MEAN		62.69031818	60.96561651	46.57009187	63.93627232	63.15722016	143.7028826	122.9225208	56.13766876
415	SD									
416	MINIMUM		62.69031818	60.96561651	46.57009187	63.93627232	63.15722016	143.7028826	122.9225208	56.13766876
417	MAXIMUM		62.69031818	60.96561651	46.57009187	63.93627232	63.15722016	143.7028826	122.9225208	56.13766876
418										
419	<i>P. hamadryas</i>	M	54.97190199	55.37270169	45.58410286	57.15545268	56.71769537	119.8719255	107.1134364	46.52349377
420	<i>P. hamadryas</i>	M	60.71853485	58.05273995	47.51957989	61.12657574	59.72262779	135.486876	117.5520808	50.68347255
421	<i>P. hamadryas</i>	M	64.6531846	64.14913682	49.48206007	61.0700642	62.68924271	142.4163559	122.6392134	49.76515453
422	<i>P. hamadryas</i>	M	58.73616191	55.47732404	45.83369938	55.93597067	57.31472962	106.2926511	87.22554656	41.25349085

	A	B	C	D	E	F	G	H	I	J
423	<i>P. hamadryas</i>	M	56.97412435	56.16188969	46.14754317	58.9325475	58.34271466	133.1349104	112.1750371	48.81071216
424	<i>P. hamadryas</i>	M	60.22160087	58.80631933	44.246194	61.05645905	61.56602703	143.7389132	122.4654712	56.33551871
425	<i>P. hamadryas</i>	M	65.78706622	62.72062929	44.63274287	65.87264031	64.55340201	146.659598	127.2881096	52.49825228
426	<i>P. hamadryas</i>	M	60.51214981	59.71518155	42.68082316	64.04509748	64.09337918	157.7894696	136.5134147	58.47463397
427	<i>P. hamadryas</i>	M	70.74532628	68.01228803	48.01856123		69.01398685	171.8651422	139.4952327	65.33996113
428	<i>P. hamadryas</i>	M	62.41379418	61.25623353	43.18635683	70.28264374	65.04586031	158.4777185	134.9331917	57.07903444
429	<i>P. hamadryas</i>	M	65.26507896	62.20689844	47.33984549	66.25258944	66.14551148	153.1915091	133.9352712	58.32246537
430	<i>P. hamadryas</i>	M	63.2857191	62.58604334	48.1641528	60.86803629	58.05681092	130.0552584	112.5293448	51.65529269
431	<i>P. hamadryas</i>	M	61.80406345	59.25745097	44.76376147	62.94655116	61.53237952	148.5898406	129.9313609	60.70884485
432	<i>P. hamadryas</i>	M	62.72716918	60.54720384	47.53623324	64.25087926	64.46098438	149.4700339	127.7946945	62.09695192
433	<i>P. hamadryas</i>	M	66.43879774	63.20838635	46.55138631	66.68891545	64.3945321	138.4771833	118.5649853	57.85373472
434	<i>P. hamadryas</i>	M	62.93248878	63.44181243	46.78102388	65.25935541	63.63115274	146.7361939	127.0028103	60.08652601
435	<i>P. hamadryas</i>	M	59.82843756	58.49360282	47.08657457	65.32188579	62.21795119	148.7225376	122.5916513	61.72219978
436	<i>P. hamadryas</i>	M	62.11924133	60.90730579	50.2795306	69.49809074	65.69869061	139.8872787	123.2577304	57.08394415
437	<i>P. hamadryas</i>	M	66.17799545	65.79961417	50.44993925	67.2861515	66.48796584	143.7103042	125.4358363	59.41811225
438	<i>P. hamadryas</i>	M	67.55400208	64.85823131	46.78023433	64.07688114	64.45048104	145.9624624	124.021716	51.77934802
439	<i>P. hamadryas</i>	M	62.40544582	59.55579653	46.64966684	65.58453326	64.4949757	148.8229819	128.3350646	57.84059723
440	<i>P. hamadryas</i>	M	64.92644895	62.60824021	40.7431492	63.07797227	61.61995574	150.1145161	130.583203	64.69012655
441	<i>P. hamadryas</i>	M	57.69163756	55.83861685	45.85229799	63.46936196	61.46743485	126.7036602	108.0654217	52.41863539
442	<i>P. hamadryas</i>	M	61.44081466	60.03030736	44.58988622	66.72495497	63.77680045	146.8270026	122.6589122	56.22159254
443	<i>P. hamadryas</i>	M	64.36357997	62.5861055	48.44915728	66.91762285	67.81770435	151.3115987	131.8067679	62.18131092
444	<i>P. hamadryas</i>	M	62.53733578	61.61870463	47.34524236	66.57954968	68.31349679	159.5875926	128.3121865	62.45959
445	<i>P. hamadryas</i>	M	61.15387438	59.78606914	47.24016639	63.31209925	61.80065902	138.3862803	122.0574055	58.68440198
446	<i>P. hamadryas</i>	M	66.92341423	63.9856443	50.03798905	62.66851767	62.97963175	141.3927962	117.5686564	49.886327
447	<i>P. hamadryas</i> male	N=28								
448	MEAN		62.68962107	60.96573135	46.57042503	63.93560739	63.15738514	143.7029497	122.9233483	56.13834735
449	SD		3.453190177	3.165848756	2.280382095	3.408492446	3.178292627	12.89781194	10.68616558	5.824335301
450	MINIMUM		54.97190199	55.37270169	40.7431492	55.93597067	56.71769537	106.2926511	87.22554656	41.25349085
451	MAXIMUM		70.74532628	68.01228803	50.44993925	70.28264374	69.01398685	171.8651422	139.4952327	65.33996113
452										
453	<i>P. papio</i>	F	64.1387613	61.538024		62.51134056	64.16468388	149.7470783	125.2000787	68.08780194
454	<i>P. papio</i>	F	58.94898505	58.05719197		67.25270979	68.56528369	154.0471005	130.6598847	63.65539521
455	<i>P. papio</i>	F	68.22956548	65.4790073	50.26710499	73.6344542		149.0482906	126.0741344	55.15655105
456	<i>P. papio</i> female	N=3								
457	MEAN		63.77243727	61.69140776	50.26710499	67.79950152	66.36498378	150.9474898	127.3113659	62.29991607
458	SD		4.651122258	3.71328435		5.581679869	3.11169396	2.706984656	2.932648411	6.571324461
459	MINIMUM		58.94898505	58.05719197	50.26710499	62.51134056	64.16468388	149.0482906	125.2000787	55.15655105
460	MAXIMUM		68.22956548	65.4790073	50.26710499	73.6344542	68.56528369	154.0471005	130.6598847	68.08780194
461										
462	<i>P. papio</i>	M	63.2872876	61.16524357	50.19947515	65.03022831	64.78965225	150.0796187	125.4466423	59.27352648
463	<i>P. papio</i>	M	66.25696123	64.268351	52.1332108	71.91407383	70.68138446	143.107889	113.9021609	48.53867401
464	<i>P. papio</i>	M	68.92937763	67.17868946	54.60289031	66.42198957	65.03357735	146.8072602	121.6533702	66.68025484
465	<i>P. papio</i>	M	65.38676876	63.12520666	52.32190157	69.02593989	66.72314112	161.0860739	136.5872998	58.67000038
466	<i>P. papio</i>	M	66.31365123	65.05479813	46.36709547	71.43813007	69.8188072	168.5222459	144.742424	69.22007863
467	<i>P. papio</i>	M	64.50399132	62.14797404	46.06847858	72.37603315		165.7104921	141.236441	72.02581823
468	<i>P. papio</i>	M	61.11851027	58.99357009		66.62838382	63.34566484	144.2634913	115.9853948	65.42281006
469	<i>P. papio</i>	M	62.28429118	60.6617755		69.69680364	68.11281177	158.5420696	137.6761388	63.95446324

	A	B	C	D	E	F	G	H	I	J
470	<i>P. papio</i>	M								75.30105003
471	<i>P. papio</i>	M	55.62607207	53.57364613	45.5394462	66.6861048	64.92648614	168.4634364	150.890201	62.29071782
472	<i>P. papio</i>	M	59.83887451	55.61780962	47.42482483	60.17949797	65.57854989	153.513798	132.1581764	70.99444231
473	<i>P. papio</i>	M	64.14070275	62.70725216	54.06191753	70.25723332	67.43448414	155.5040699	131.534637	57.69361295
474	<i>P. papio</i>	M	61.0975619	59.15000912	51.64366177	67.23640989	66.57594876	146.1792493	119.9610028	57.58790608
475	<i>P. papio</i>	M	67.68718593	64.37855464	48.62462567	68.89839934	65.8342259	155.0544974	131.4242014	63.84936661
476	<i>P. papio</i>	M	64.5053794	62.22366093	52.14202518	69.68665274	67.5535704	148.6124746	123.9026525	60.95135664
477	<i>P. papio</i>	M	63.12862349	60.695312		65.73746671	66.18967357			61.49436141
478	<i>P. papio</i>	M	64.5836668	61.88019931	48.06164347	68.88168695	67.08412982	130.2021199	110.991728	53.68719862
479	<i>P. papio</i>	M	67.57757808	65.41819191	54.48054462	69.07842309	67.49272367	146.2798348	122.5858148	61.24652158
480	<i>P. papio</i>	M	61.12211737	60.28873965		64.72617601	64.15653765	140.640715	117.5107841	59.5376445
481	<i>P. papio</i>	M	64.27279211	63.60386775	50.33236872	64.3045976	63.23083014	134.4766071	113.4171985	57.58388387
482	<i>P. papio</i> male	N=13								
483	MEAN		63.7716523	61.69120272	50.26694066	67.80022267	66.36456662	150.9469968	127.3114593	62.30018442
484	SD		3.159418216	3.310471094	3.104213358	3.039597633	2.017633659	10.90117728	11.61238644	6.42339344
485	MINIMUM		55.62607207	53.57364613	45.5394462	60.17949797	63.23083014	130.2021199	110.991728	48.53867401
486	MAXIMUM		68.92937763	67.17868946	54.60289031	72.37603315	70.68138446	168.5222459	150.890201	75.30105003
487										
488	<i>P. ursinus</i>	F	72.9167734	73.08984974	47.28564601	77.47763788	75.43601659	237.9658598	206.3921411	97.38354915
489	<i>P. ursinus</i>	F	69.02817801	65.82904865	52.27779925	72.71954604		169.7920303	139.245608	69.12426114
490	<i>P. ursinus</i>	F	66.18532271	65.1338414	52.49135519	75.05303445	68.80796263	181.8754389	153.3152216	83.8997267
491	<i>P. ursinus</i>	F	69.03129289	65.76659467	50.78188969	72.19294455	72.22810395	171.783401	145.4679696	75.60099404
492	<i>P. ursinus</i>	F	77.4792521	74.9653564	52.28956688	80.67847786	81.08790014	216.0294739	178.6076762	101.840339
493	<i>P. ursinus</i>	F	76.87835863	76.09160594	53.24596287	70.68687721	72.45959836	182.4433314	153.199893	73.34497836
494	<i>P. ursinus</i>	F	68.89977931	67.58600702	51.41633871	70.32051206	71.67340002	170.069568	143.1907339	74.88984974
495	<i>P. ursinus</i>	F	71.58577891	68.24776531	47.37679186	65.03170624	68.75108207	180.2893019	154.6420458	74.57233368
496	<i>P. ursinus</i>	F	72.09469656	71.65195249	52.27456798	69.59646659	67.42560745	183.7321617	152.1169844	78.32893426
497	<i>P. ursinus</i>	F	70.62012778	67.3645324	51.7051948	68.02169032	68.58460504	179.0634134	152.325932	77.90964728
498	<i>P. ursinus</i>	F	69.48710159	68.9413206	52.09414187	69.4196411	72.51880974	173.6264874	148.6249096	80.27052542
499	<i>P. ursinus</i>	F	68.87119919	68.42256305	48.37975266	69.55182782	72.37481732	169.7133612	142.4242936	79.45418397
500	<i>P. ursinus</i>	F	68.82647978	68.56416777	53.71157597	71.93414347	73.05437507	169.8042129	148.9095855	71.82509891
501	<i>P. ursinus</i>	F	68.45344617	68.038608	52.51570364	71.35089864	70.86779708	175.7760178	153.020232	78.92681491
502	<i>P. ursinus</i>	F	67.91272176	66.62790391	48.50607198	65.10665192	65.21825468	176.6517661	152.3063922	75.66389793
503	<i>P. ursinus</i>	F	70.94681387	69.97076636	52.58158771	68.40525305	69.34232417	180.5062191	155.8534141	74.27582681
504	<i>P. ursinus</i>	F	72.5815393	70.9339118	52.22916907	69.83576859	69.03536081	182.2621191	156.9299092	79.53063858
505	<i>P. ursinus</i>	F	67.30487975	65.32823584	45.86604624	63.65278683	66.95828788	197.7204923	169.6935407	77.11583708
506	<i>P. ursinus</i>	F	70.33713493	67.59191836	49.77060816	66.58846292	65.88084857	172.7555636	151.0217056	75.8756617
507	<i>P. ursinus</i>	F	64.53105954	63.92378225	50.30316649	68.56381107	71.8714694	164.1804431	141.6920359	81.06761359
508	<i>P. ursinus</i>	F	74.36082933	73.27215873	54.80964117	84.12494179	87.64412036	186.3115766	147.9983198	69.58396341
509	<i>P. ursinus</i>	F	77.99043743	75.0914503	54.53315683	79.4000898	85.4464603	175.0199323	141.6202321	70.63495014
510	<i>P. ursinus</i>	F	78.22989417	76.88588636	56.48217677	83.55960078	89.50770631	187.3326688	145.79862	76.58289111
511	<i>P. ursinus</i>	F	79.51469042	76.86650728	58.37910604	86.23046214	86.80623099	188.089555	154.1739691	72.47570832
512	<i>P. ursinus</i>	F	73.77239135	71.7049676	47.41396376	76.91647061	82.8259428	180.3566153	148.2400804	73.58102857
513	<i>P. ursinus</i>	F	76.41078805	74.48978098	52.75763576	87.85206093	91.15379239	191.7779837	149.7482044	67.04888489
514	<i>P. ursinus</i>	F	71.31539739	72.75746003	49.90293554	72.26304532	72.06282969	183.9096523	154.6078157	74.05988839
515	<i>P. ursinus</i>	F	69.43545692	67.30362266	47.90252036	69.17809004	70.26389456	189.0234182	160.5648624	82.66118011
516	<i>P. ursinus</i>	F	69.5585765	69.69089023	50.47552903	67.62652756	71.58078856	182.9261931	155.011659	79.39161109

	A	B	C	D	E	F	G	H	I	J
517	<i>P. ursinus</i>	F	65.01984869	63.72997586	50.15006263	68.1075467	69.38526595	157.8140355	130.5374809	75.60982645
518	<i>P. ursinus</i>	F	69.47800157	69.36460357	52.9177441	69.71810111	70.88305774	166.2052847	144.1105431	74.80352495
519	<i>P. ursinus</i>	F	68.73170701	67.3840096	50.11783313	69.55482285	70.36107412	176.0029166	151.8582145	76.54860709
520	<i>P. ursinus</i>	F	72.01984722	70.0588826	50.58692771	70.55006359	70.09219385	172.299219	143.7103462	72.99129155
521	<i>P. ursinus</i>	F	66.92020185	65.70770103	50.42398026	71.75759377	72.43503131	171.8823824	143.8638636	72.09922091
522	<i>P. ursinus</i>	F	71.98715634	71.39203964	54.57100172		72.36332682	180.6762386		72.04321951
523	<i>P. ursinus</i>	F	65.64408361	63.55871024	47.41971861	67.45305995	68.1885291	174.4073136	148.0911016	78.4740558
524	<i>P. ursinus</i>	F	72.35344334	71.297916	44.84940734	76.06540845	78.71090956	239.3542146	209.9661766	105.6390917
525	<i>P. ursinus</i>	F	68.10764144	65.86690908	49.97746838	72.56454033	71.43217439	195.5601028	167.7034051	75.40039931
526	<i>P. ursinus</i>	F	75.59778626	74.0629004	53.90167168	78.24769469	84.79632095	186.7233335	151.4508484	77.45567051
527	<i>P. ursinus</i>	F	69.59228212	68.0229812	51.19310781	80.50329767	84.49446873	179.4317727	146.9791241	75.29806188
528	<i>P. ursinus</i>	F	69.31642733	68.24387875	52.32991442	69.86912658	73.50450446	169.6115891	144.9645649	73.12592793
529	<i>P. ursinus</i>	F	67.06843964	65.2674353	51.31327677	70.45076576	70.68609925	188.5740479	162.6773431	88.42257052
530	<i>P. ursinus</i>	F	77.33886495	75.4145387	56.37542306	80.72208108	90.96216848	176.180461	146.0373258	63.67497588
531	<i>P. ursinus</i>	F	77.25047933	74.74315411	55.22333336	79.85325123	92.45244028	189.4411913	153.5732542	76.17418629
532	<i>P. ursinus</i>	F	73.81290057	71.62146368	53.29248558	79.45920357	85.57829439	178.9694562	143.6397846	66.04332558
533	<i>P. ursinus</i>	F	70.28029592	69.08947911	52.75528043	79.04116988	85.12063895	175.421894	142.1692942	74.26520916
534	<i>P. ursinus</i>	F	74.65313427	72.93595917	53.5461812	75.79912217	86.91507645	166.4198118	136.4303273	66.69433141
535	<i>P. ursinus</i>	F	77.60884303	76.25321207	53.09047138	83.76994497	85.86296401	180.7828427	144.632645	77.56777473
536	<i>P. ursinus</i>	F	75.00547042	72.86597328	52.29931627	76.51421591	83.51522139	177.7889743	146.9624152	71.65145374
537	<i>P. ursinus</i>	F	77.40706135	74.8696983	54.28317779	74.42357457	80.16066145	178.3633922	148.6238433	73.8383204
538	<i>P. ursinus</i>	F	70.22868374	68.70578091	49.6079803	68.97830911	71.60824042	183.925488		78.17721406
539	<i>P. ursinus</i>	F	65.57512337	64.99193349	49.88404687	68.24910409	69.92182458	173.0786913	149.166412	77.40176907
540	<i>P. ursinus</i>	F	67.9452371	66.56860885	48.08993044	66.47409582	66.96165969	171.1062292	139.6951894	69.22879312
541	<i>P. ursinus</i>	F	65.99933289	65.72704324	61.89211941		66.84117285	157.2132695	127.9104787	65.50148167
542	<i>P. ursinus</i>	F	70.95236676	70.75987523	52.97520105	69.69558747	70.36820476	180.6897377	153.4680724	80.12394695
543	<i>P. ursinus</i>	F	67.71377108	66.02316282	51.19855919	66.22309047	68.59901042	165.3466376	138.8223975	74.59240545
544	<i>P. ursinus</i>	F	69.07891956	67.84310425	54.15617653	71.60132733	74.29144446	177.3639471	153.2190457	75.0910253
545	<i>P. ursinus</i>	F	65.09178954	62.85470479	52.46870795	70.46963301	70.14044482	163.8530209	139.876673	72.69794405
546	<i>P. ursinus</i>	F	65.81254112	63.12957786	47.20543106	70.23692146	74.53645772	175.4724612	150.8940057	66.60149557
547	<i>P. ursinus</i>	F	63.84280094	62.66523798	49.47028189	66.08649187	67.78993881	167.6122665	143.6197185	76.56191469
548	<i>P. ursinus</i>	F	66.81037604	65.95178593	50.98061739	71.20784299	72.93527931	157.180663	132.2704927	68.94869377
549	<i>P. ursinus</i>	F	64.77559103	62.73686122	48.28829978	70.35433002	67.63755841	175.2067555	149.3700211	71.45014378
550	<i>P. ursinus</i>	F	65.69568177	64.73421146	44.65370955	68.98303404	70.1067899	175.6652803	146.73558	76.49149073
551	<i>P. ursinus</i>	F	69.07618928	66.31612962	52.83846641	70.8656706	73.68664848	173.4127505	140.9414366	68.60231338
552	<i>P. ursinus</i>	F	70.75217933	68.32006573	51.70752718	70.12168713	76.58470644	171.219392	142.958894	70.48876292
553	<i>P. ursinus</i>	F	68.83183479	66.57942894	51.74676516	67.35409326	71.22428008	160.7251896	134.2807129	65.19393431
554	<i>P. ursinus</i>	F	70.61562788	67.70581622	49.52302076	70.19600097	74.50580808	174.4033005	149.442416	67.75216181
555	<i>P. ursinus</i>	F	65.99095906	64.39031227	49.22292428	68.21318145	70.21699441	174.3148731	149.235582	77.92682481
556	<i>P. ursinus</i>	F	67.04993829	66.78970926	48.59899338	71.8190113	74.40975487	181.2601091	154.6160664	68.08529718
557	<i>P. ursinus</i>	F	68.00531064	67.53495255	50.21243606	70.52306279	74.05649875	175.0105957	150.0691883	67.2556339
558	<i>P. ursinus</i>	F	68.54916881	68.60717391	48.53638499	70.25211682	73.29660775	186.154329	162.2696067	76.66700234
559	<i>P. ursinus</i>	F	70.78376007	69.4974158	51.74088677	70.17443187	72.05897664	166.1382481	142.4637985	72.31128416
560	<i>P. ursinus</i>	F	80.744058	78.6663971	52.27143271	73.13433311	69.21532474	204.4349243	178.8050264	91.45739056
561	<i>P. ursinus</i>	F	69.60350936	67.63540025	56.25274197	74.06020347	75.34726956	174.5457575	142.162111	72.49271885
562	<i>P. ursinus</i>	F	65.78115363	65.05117976	52.02545165	70.77049117	75.21151479	180.8326403	154.9531884	71.69810901
563	<i>P. ursinus</i>	F	64.62448565	62.99140492	48.12764806	64.61158621	69.58186968	163.6475805	139.7011278	74.03857146

	A	B	C	D	E	F	G	H	I	J
564	<i>P. ursinus</i>	F	65.0420955	63.70320226	48.67412337	71.13881879	73.35642352	166.4307021	139.5697014	66.89996188
565	<i>P. ursinus</i>	F	66.82769956	65.64491588	50.70838813	68.3233268	72.93573458	179.3214846	151.759104	67.73617067
566	<i>P. ursinus</i>	F	67.77488648	66.8567888	50.07819758	65.55523106	68.37975093	174.7196273	147.3820316	79.42021365
567	<i>P. ursinus</i>	F	69.50017461	69.61594501	51.74065543	70.59409027	71.00491271	188.7597363	162.6495866	79.25982359
568	<i>P. ursinus</i>	F	68.37163726	66.83210373	49.81930284	65.98040831	69.72991489	166.9059784	141.5174458	81.08385916
569	<i>P. ursinus</i>	F	68.22060777	66.86299787	48.29361372	67.0071953	71.51363239	181.7919121	157.220183	81.06177167
570	<i>P. ursinus</i>	F	68.0567485	64.55566597	49.15866538	63.92436313	68.20609096	184.8897034	158.5342568	76.83595654
571	<i>P. ursinus</i>	F	67.80101669	67.94555933	52.09390279	69.81211975	72.02096692	184.1174596	154.4981318	73.30031559
572	<i>P. ursinus</i>	F	66.84776756	65.18593119	52.19439084	70.83233646	74.15719285	173.0861103	145.4674114	75.43919882
573	<i>P. ursinus</i>	F	77.35222459	76.68302132	54.63794796	81.52992623	86.47720841	184.8682014	156.7720524	75.89655164
574	<i>P. ursinus</i>	F	75.08716533	74.87811136	52.82017119	82.19051237	87.21074783	182.8319867	149.5519892	71.12591132
575	<i>P. ursinus</i>	F	78.05525056	77.15832997	57.30922144	82.44747636	88.59389147	192.1156797	155.3096799	64.68590863
576	<i>P. ursinus</i>	F	77.44341809	75.78300062	55.46991444	84.67373215	89.18780485	179.7734713	147.1515525	74.02463304
577	<i>P. ursinus</i>	F	74.36793633	72.43081503	48.36202653	81.21594211	88.30359673	189.1641699	156.1524947	75.14276475
578	<i>P. ursinus</i>	F	70.24139407	71.1055643	54.01145724	81.50301252	86.55776027	181.6756385	146.3392245	74.0532135
579	<i>P. ursinus</i>	F	76.15796042	73.83822253	56.75812984	86.27577501	88.50778804	181.0875027	146.2426482	66.69386805
580	<i>P. ursinus</i>	F	72.38180738	71.27266414	56.89475495	81.0853703	84.72909501	179.4844291	147.6151876	66.87250546
581	<i>P. ursinus</i>	F	69.04815175	66.76762305	48.65875246	62.87409788	66.98213198	182.2296438	156.67304	83.82738739
582	<i>P. ursinus</i>	F	67.17613403	65.45331424	49.46472097	64.50814575	69.94141117	180.9509644	155.2391508	77.39019711
583	<i>P. ursinus</i>	F	66.5486699	66.55606463	50.41452676	66.4686694	69.42289402	168.0023164	142.8324238	74.56594244
584	<i>P. ursinus</i>	F	70.82353268	68.20695325	52.49124826	77.72162511	79.58282889	215.3267744	180.3878919	102.1994073
585	<i>P. ursinus</i>	F	68.64930262	66.49637755	50.68785436	67.51005335	69.54310258	176.3374688	149.3093029	72.33400057
586	<i>P. ursinus</i>	F	67.5969232	66.2670023	50.3461858	66.24206378	71.7581498	175.817186	149.7414473	70.86201647
587	<i>P. ursinus</i>	F	68.98247243	67.35860259	49.56405748	66.78772719	69.7676891	183.1636234	155.0833922	84.16082282
588	<i>P. ursinus</i>	F	70.03069336	68.21789981	49.25488588	69.79683753	70.76188184	174.5604681	148.7256543	76.13847293
589	<i>P. ursinus</i>	F	69.71004284	66.71631654	46.01763257	66.82003403	68.90836849	176.1150082	147.8302865	81.34395537
590	<i>P. ursinus</i>	F	66.83908958	66.26623603	51.09969779	66.67473669	68.50374385	177.365906	152.5138642	79.81882142
591	<i>P. ursinus</i>	F	71.49282498	70.10656194	52.91890142	72.16509749	73.85055112	193.6574196	165.6734366	91.09796199
592	<i>P. ursinus</i>	F	66.48425178	63.94277299	51.17197187	64.59919621	66.80408119	179.4548777	152.5034282	79.95536966
593	<i>P. ursinus</i>	F	67.37168983	66.08693613	53.7600314	74.08986149	72.79565751	190.9357554	164.8372347	78.1330243
594	<i>P. ursinus</i>	F	68.69919695	69.01987843	49.9135472	67.63267131	69.44781432	180.1043394	156.7296839	78.51777828
595	<i>P. ursinus</i>	F	68.60438702	68.2825468	52.24259322	69.89743527	72.24126155	202.1442832	177.9341858	90.85825148
596	<i>P. ursinus</i>	F	70.6520856	67.93948576	51.99403345	70.64044763	70.96706672	188.4655674	164.0554308	77.13605758
597	<i>P. ursinus</i>	F	70.66006898	70.20709848	51.23424521	69.59882067	71.52103374	187.8008492	158.6821154	76.29773189
598	<i>P. ursinus</i>	F	72.09378204	68.86139033	51.16601568	70.05500906	70.61570893	195.3645868	169.7464896	84.16348605
599	<i>P. ursinus</i> female	N=112								
600	MEAN		70.27637652	68.8267302	51.40071074	72.07882401	74.58355435	180.1021054	151.7789383	76.03525675
601	SD		3.875107508	3.831761796	2.837357116	5.804304029	7.083069337	12.9720319	12.28173558	7.447227548
602	MINIMUM		63.84280094	62.66523798	44.65370955	62.87409788	65.21825468	157.180663	127.9104787	63.67497588
603	MAXIMUM		80.744058	78.6663971	61.89211941	87.85206093	92.45244028	239.3542146	209.9661766	105.6390917
604										
605	<i>P. ursinus</i>	M	74.79746516	72.46225035	47.79016805	65.52414579	65.35391555	197.7455151	171.3047457	84.08234858
606	<i>P. ursinus</i>	M	67.92547138	67.1468103	53.24546663	72.40572547	72.11025196	184.318845	154.4532566	81.42924299
607	<i>P. ursinus</i>	M	70.43610058	70.96196828	53.82398551	73.93011729	74.96010738	183.7407284	161.147874	82.72993809
608	<i>P. ursinus</i>	M	69.30107247	67.02174797	51.85981419	70.90781605	69.68788157	175.8806297	146.7335175	76.84651223
609	<i>P. ursinus</i>	M	72.68882136	70.58067116	54.97647008	70.22097513	72.59087225	184.4785845	148.9952588	77.96987656
610	<i>P. ursinus</i>	M	71.94188504	70.24824717	50.35040623	78.31116567	78.50209434	177.908097	143.5963507	78.74736532

	A	B	C	D	E	F	G	H	I	J
611	<i>P. ursinus</i>	M	72.55888177	69.54745061	46.79590122	78.3131742	82.24224258	187.1272497	153.8280149	77.32995315
612	<i>P. ursinus</i>	M	63.86396525	62.40705094	49.41681299	71.16778878	72.75287523	163.2721681	135.4903338	73.28481924
613	<i>P. ursinus</i>	M	70.74355831	67.73169724	47.11364124	71.52496612	73.2794309	177.2826615	147.4629595	74.27368513
614	<i>P. ursinus</i>	M	71.73915532	70.57190097	52.03988424	69.63346586	73.02919127	175.2021485	143.6952808	69.38146052
615	<i>P. ursinus</i>	M	69.91386798	70.10098097	49.20889551	65.74719578	67.09532312	150.5329998	128.2602612	86.41120911
616	<i>P. ursinus</i>	M	70.13463154	68.91982596	51.66705176	69.66248449	70.66433292	184.530513	156.5475386	84.60868551
617	<i>P. ursinus</i>	M	64.09105299	62.84489188	49.88210806	69.67340733	72.47423982	164.8434266	135.1483574	81.77313758
618	<i>P. ursinus</i>	M	69.30061941	67.84383468	46.90237898	68.17132761	69.8093364	172.1592122	140.9950405	76.85373966
619	<i>P. ursinus</i>	M	75.46304682	74.44562969	58.69015231	72.09572927	76.8134993	195.9708044	166.7165285	78.04218341
620	<i>P. ursinus</i>	M	77.71779012	75.37314589	56.85893495	81.68721014	87.83096354	170.7227987	133.2293451	67.21508045
621	<i>P. ursinus</i>	M	75.23141758	73.55359943	51.58104383	83.97765001	89.05790212	172.1415961	134.8269311	69.5697218
622	<i>P. ursinus</i>	M	75.28781845	74.91453478	55.73743873	84.18251664	88.22264489	169.7011468	131.5296281	72.34844362
623	<i>P. ursinus</i>	M	72.68882136	70.58067116	54.97647008	70.22097513	72.59087225	184.4785845	148.9952588	77.96987656
624	<i>P. ursinus</i>	M	75.46980907	73.71776959	50.64489568	83.50748944	87.75943168	193.2478241	154.0305268	76.25369057
625	<i>P. ursinus</i>	M	68.97596448	68.63835054	45.95052016	67.46405905	69.58433783	186.1882473	158.773364	74.05746296
626	<i>P. ursinus</i>	M	70.95724716	71.30426629	50.67589555	72.82477079	71.33323913	191.6648717	164.3303047	85.76297667
627	<i>P. ursinus</i>	M	62.41147312	61.89058839	47.86432864	74.39719234	74.13921838	179.6885615	154.8982571	80.54962611
628	<i>P. ursinus</i>	M	64.78215984	65.12761263	49.9402744	76.69566215	78.27746582	187.0825011	156.4319958	83.55580769
629	<i>P. ursinus</i>	M	70.72976628	69.20677596	53.97056514	66.84710049	68.31289316	162.5943926	137.4519194	68.64680493
630	<i>P. ursinus</i>	M								78.11517435
631	<i>P. ursinus</i>	M	73.53699524	74.67737948	56.10270552	72.44412878	68.57289653	206.7830827	182.5564655	80.52273312
632	<i>P. ursinus</i>	M	75.43481303	73.34229287	56.8104981	68.95727356	70.59548263	193.5798314	167.0264275	78.93413346
633	<i>P. ursinus</i>	M	71.24462364	69.12729526	54.42010292	68.89896368	71.33559857	183.0968954	156.0828856	72.54464314
634	<i>P. ursinus</i>	M	69.42739564	67.38336623	54.54019333	70.31017124	70.24918924	174.630421	151.1495835	78.51583258
635	<i>P. ursinus</i>	M	69.06107756	67.88239007	54.82192007	73.28335533	72.34296125	175.4279266	148.7310447	75.57768484
636	<i>P. ursinus</i>	M	69.18425196	66.83353386	51.24367745	68.97119046	70.06308817	173.4466935	154.5203995	79.12356433
637	<i>P. ursinus</i>	M								65.03946897
638	<i>P. ursinus</i>	M	67.64450754	66.44694048	51.2187445	68.55616717	67.57445432	176.2090383	148.9951825	65.57139821
639	<i>P. ursinus</i>	M	69.13033091	67.31950645	49.95237697	69.45035253		196.3678705	166.9860052	88.5771413
640	<i>P. ursinus</i>	M	69.2351317	67.67636588	49.08002068	68.78906194	69.42964164	190.3992804	166.5463634	74.07709626
641	<i>P. ursinus</i>	M	67.42234676	66.81635402	50.49664326	67.12763702	68.07618867	186.4154688	160.1428445	79.35029416
642	<i>P. ursinus</i>	M	64.79649422	61.19722547	51.37593987	67.31116313	71.30975707	131.0683616	106.9705405	57.25769858
643	<i>P. ursinus</i>	M	76.22992988	74.33822418	56.05726096	87.22394682	91.74969349	197.7569773	154.1947865	75.2791529
644	<i>P. ursinus</i>	M	69.67305614		53.53133499	73.36968806	79.39145773	167.1263623	131.2396382	73.64629001
645	<i>P. ursinus</i>	M	70.41066426	69.06890383	51.0178963	72.64371187	79.37607219	162.9571702	130.2758217	69.16202081
646	<i>P. ursinus</i>	M	76.92373467	74.12169684	56.65411669	77.79124563	86.49207785	189.2976534	157.4003506	70.03489018
647	<i>P. ursinus</i>	M	68.02721283	65.03983284	50.73004488	74.54325739	84.89059782	163.8726845	134.2796506	62.91653006
648	<i>P. ursinus</i>	M	69.11848087	67.17300362	52.20942094	77.95683271	85.20988768	186.7976219	155.9485279	72.26276217
649	<i>P. ursinus</i>	M	65.49087762	65.41987408	40.51022612	71.18612537	72.70778706	173.7089711	139.7895348	66.98879016
650	<i>P. ursinus</i>	M	65.64432003	65.36575778	49.91652054	72.79358063	80.18742601	174.0062817	153.2293249	71.45158792
651	<i>P. ursinus</i>	M	69.5150199	67.20156872	49.54866425	72.54747591	77.41401916	162.3841252	133.0542553	73.946368
652	<i>P. ursinus</i>	M	69.7102885	67.60368382	51.82578844	67.33049888	69.8856264	165.024632	133.7737854	72.31624474
653	<i>P. ursinus</i>	M	67.3787009	65.44585784	42.74347997			178.9508607	156.4750206	72.09537321
654	<i>P. ursinus</i>	M	63.016767	61.34724471	51.40026957	70.15187919	70.36800818	172.5293052	140.4687519	88.26537195
655	<i>P. ursinus</i>	M	67.98222106	66.20177031	47.55987236	70.03131477	72.35206261	186.8132202	159.3563148	81.61382113
656	<i>P. ursinus</i>	M	68.84628923	65.40477431	47.90692355	67.4499369	71.7883728	182.1660308	156.3078579	75.06651134
657	<i>P. ursinus</i>	M	66.2614784	64.250972	51.68247326	69.79760074	70.23099791	172.5175349	144.7545645	84.14197397

	A	B	C	D	E	F	G	H	I	J
658	<i>P. ursinus</i>	M	71.54585442	70.51195498	52.53975814	69.03113142	72.18085196	183.5074098	153.429318	79.05781635
659	<i>P. ursinus</i>	M	74.13213311	71.75236555	45.10471449	70.17281545	75.74554331	200.0474881	172.1916101	94.5706946
660	<i>P. ursinus</i>	M	63.9353192	63.91255517	46.8428426	69.73161533	72.65289649	178.235636	149.5482293	80.48565302
661	<i>P. ursinus</i>	M	71.66666136	70.23532204	54.2989959	73.18535291	73.80702735	165.749197	139.1104317	72.05341487
662	<i>P. ursinus</i>	M	64.11246186	62.64460303	47.18249225	69.39988851	71.6168121	168.76984	145.1713756	78.84746845
663	<i>P. ursinus</i>	M	76.59818045	75.26114445	53.088717	76.96534483	84.48134914	187.0001188	152.4801507	73.61060718
664	<i>P. ursinus</i>	M	69.89365295	67.58924345	53.28397469	66.33956562	69.9906554	183.4532661	160.7436733	79.39132923
665	<i>P. ursinus</i>	M	69.23219331	67.97142372	49.11585727	70.0027994	73.57458489	176.4368217	149.2482248	73.63564814
666	<i>P. ursinus</i>	M	75.25016173	74.07450519	51.25890083	83.70171993	88.27086672	193.2554821	159.6218842	72.84336202
667	<i>P. ursinus</i>	M	73.59962848	73.16825841	57.60117316	85.0322781	86.13764595	174.8330315	146.5310093	56.55461544
668	<i>P. ursinus</i>	M	80.81281129	78.0459056	59.36138747	86.52632291	90.72196062	193.0270482	158.721522	67.40798894
669	<i>P. ursinus</i>	M	74.15441742	73.4112409	56.58922606	83.14879826	86.99559971	172.7918929	138.9502579	64.75620884
670	<i>P. ursinus</i>	M	66.77680158	65.6024123	49.16993237	66.42794088	68.52819922	172.0929908	148.0583489	83.16942882
671	<i>P. ursinus</i>	M	76.45836296	74.14931093	58.31936055	83.60470866	87.37585506	200.2946628	168.4843508	68.40952072
672	<i>P. ursinus</i>	M	77.2228567	76.04408145	57.60331033	82.19113317	87.50915616	178.820698	145.1319669	62.54730434
673	<i>P. ursinus</i>	M	73.91655581	72.62121819	50.05731521	84.95441462	89.39307728	190.493913	156.2525786	64.39064203
674	<i>P. ursinus</i>	M	76.12385294	75.11190276	56.05031167	82.52934489	85.30362535	175.9875941	145.8784624	68.58394233
675	<i>P. ursinus</i>	M	65.00954803	64.26636919	45.13377694	64.05921353	68.51270331	184.2236961	158.7307509	82.37146758
676	<i>P. ursinus</i>	M	67.70739091	65.56867109	47.77087766	70.2537544	68.78815852	186.2027639	156.15764	75.80584186
677	<i>P. ursinus</i>	M	66.86227959	65.45000251	51.5361425	65.98887573	70.12184564	173.5734255	149.856144	73.13729183
678	<i>P. ursinus</i>	M	75.85093865	73.87829471	50.73589962	70.35173584	73.78620109	199.6299118	170.0658875	82.18594631
679	<i>P. ursinus</i>	M	65.49290229	63.38005569	48.7005607	65.91448649	67.00418709	162.5130625	138.387006	75.41122776
680	<i>P. ursinus</i>	M	68.18806098	64.94018322	53.85016916	67.73243326	69.84062693	129.2661349	108.7003236	53.18193512
681	<i>P. ursinus</i>	M	76.95797365	74.85263175	54.87776017	87.12088968	92.2373189	192.2676259	157.8575664	76.5888961
682	<i>P. ursinus</i>	M	76.95201315	73.672461	55.43126276	86.22681953	88.58574925	191.8566215	163.071028	74.06110397
683	<i>P. ursinus</i>	M	65.03210962	65.3990561	50.92468835	63.39570286	70.20265282	162.2453038	135.9300026	77.9588252
684	<i>P. ursinus</i>	M	67.15576954	67.39426613	43.92537198	68.90818148	71.29658938	180.157233	152.2734435	89.15937315
685	<i>P. ursinus</i>	M	73.45367859	72.20623966	50.12719409	67.97379637	74.98953778	179.4323711	154.2632259	75.31709381
686	<i>P. ursinus</i>	M	69.72863738	68.02393916	53.07764156	65.97665766	68.23070735	174.9220397	151.0187651	74.70614379
687	<i>P. ursinus</i>	M	68.54013628	66.23418639	49.38566718	65.67434011	67.04481366	173.7395639	151.9183439	72.92741337
688	<i>P. ursinus</i>	M	68.04026283	66.36525346	53.40319915	68.4063851	69.0378572	177.3414252	153.1102717	70.08188695
689	<i>P. ursinus</i>	M	65.22391348	64.30787109	52.47305702	69.73962901	73.41579027	176.7755632	152.8349959	75.99392226
690	<i>P. ursinus</i>	M	70.56433957	69.58212808	49.63055241	68.43458183	68.48064298	185.3737861	159.1033892	73.86707002
691	<i>P. ursinus</i>	M	70.87122006	69.68552597	51.56263729	69.8317469	67.3145312	191.0307901	167.7182134	85.76420448
692	<i>P. ursinus</i>	M	69.58573697	66.35591402	50.8301764	68.29003293	70.83547666	194.9034195	166.0265248	88.56932031
693	<i>P. ursinus</i>	M	66.05097485	64.13480248	53.2420933	68.19953062	70.83440867	175.8770979	146.3922781	76.57430491
694	<i>P. ursinus</i>	M	70.48809726	69.49051498	52.08387742	71.47650059	73.62898404	202.9261245	174.4713497	86.23362931
695	<i>P. ursinus</i>	M	73.8442527	71.58838863	53.4385159	69.44730649	67.68547144	185.6080776	158.5232547	84.07859158
696	<i>P. ursinus</i>	M	69.91303387	68.40572537	50.10477926	67.36599595	69.94707491	184.5724565	161.646139	77.35410843
697	<i>P. ursinus</i>	M	69.68394886	68.34918515	53.77596086	68.5144038	70.85866371	170.1607838	146.1866532	79.17723844
698	<i>P. ursinus</i>	M	73.36683017	72.03828695	53.36762895	70.1763202	71.89613859	175.5396552	151.7472181	82.87726202
699	<i>P. ursinus</i>	M	67.75587974	66.65525027	48.36840579	66.68686537	67.55804826	167.5241946	140.4124262	75.52752698
700	<i>P. ursinus</i>	M	68.60243915	68.24979153	50.3214999	71.06486171	72.9933586	174.2943825	147.2671933	74.76705333
701	<i>P. ursinus</i>	M	67.28614883	66.58190345	50.55831842	69.28711602	72.99233832	180.3359435	158.8594551	83.17280843
702	<i>P. ursinus</i>	M	74.26451317	73.2897258	52.14911381	69.37905914	72.97792429	202.6803757	170.8419402	82.54496759
703	<i>P. ursinus</i>	M	57.94432653	57.88673118	44.46716175	74.00557171	75.96021563	191.2498744	165.5122649	86.07064104
704	<i>P. ursinus</i>	M	76.59441634	75.40310336	54.68198645	71.37184897	69.95798883	191.8759668	165.7334989	78.81659088

	A	B	C	D	E	F	G	H	I	J
752	MEAN		67.98631809	66.33525133	50.17751907	70.14015836	71.09500848	168.83959	143.0795996	66.86410851
753	SD		5.422008242	4.944130919	3.662810123	5.677077191	6.947392852	20.37972647	18.69190787	13.38837412
754	MIN		25.49341024	51.53528577	38.18371091	45.77875864	56.71769537	106.2926511	82.69677249	18.53175772
755	MAX		81.63390755	85.12501396	61.89211941	87.95896472	92.45244028	239.3542146	209.9661766	105.6390917

University of Cape Town

	K	L	M	N	O	P	Q	R	S	T	U
1											
2	NAS-FMT	NAS-FMO	NAS-FTP	RHI-ANS	RHI-ZYO	RHI-ZYM	ANS-ALV	ANS-IPM	ALV-IPM	ALV-PMM	IPM-ZYO
3	13.78917043	44.42237039	55.5162491	47.39522955	70.25972222	70.71467708	15.29967944	21.71789814	26.21116374	78.2977481	109.3346918
4	17.607841	42.95020735	66.49345741	40.93606991	84.10127016	81.95038261	23.79040406	22.92047065	28.64292445	86.9304679	120.9562538
5	13.83422589	41.87519688	53.73423451	32.65592812	61.5356952	68.3889934	22.4569805	21.39629154	24.08687454	72.55721422	93.20820935
6	13.40792229	41.06659093	52.89191966	32.75347496	63.00159908	69.4102362	21.81479643	20.98811336	22.17000678	69.00069085	93.50598203
7	10.98554502	40.10539355	52.4836051	31.81277871	60.53183602	68.32119424	23.04754402	22.64420094	22.56125062	75.62436494	91.78795393
8	13.53739441	41.27551843	52.67273561	31.17173989	65.4060081	68.55138775	16.0899911	19.39124241	22.83289273	66.71658047	89.08519662
9	15.9943894	40.87841159	56.36443162	35.65581284	73.04976784	71.33977978	19.37353068	18.04982878	21.92396288	75.45223444	102.6929959
10	13.05487361	38.76736988	49.58618069	31.36349042	61.37031445	64.83251943	21.64219195	19.31304458	21.30836769	65.29374139	93.26135105
11	13.30447719	38.4130937	55.84807267	32.07840139	60.41448395	68.17339581	21.02493961	19.81396741	21.9746204	69.71437073	90.27502072
12	10.02031777	36.75690634	51.98853673	29.6639812	51.9842655	61.55442741	17.71232187	18.4362266	21.42522927	56.35739802	75.78995201
13	12.08049318	40.5060982	48.02088797	31.9957257	62.49616578	65.83489355	18.78156581	19.98639287	24.57489719	65.97393278	89.5809882
14	12.45326668	38.23179424	48.88756048	28.07746141	55.1141937	63.5245535	20.41664233	20.78211532	24.05893978	65.01711952	79.41724963
15	14.55518943	38.92912372	57.81511192	28.57459397	51.24737687	61.47768242	20.14754551	25.18820197	32.5906215	56.13203079	76.63118557
16	17.3349067	37.54927829		30.77179151	61.8006205	65.94814783	23.67523512	24.6557763	34.73823851	75.15618678	85.0188149
17	14.57676671	36.24254826		26.2025146	56.60642814	63.43385874	19.49847103	24.46517091	29.82467966	62.04089513	80.12780894
18		41.7686641	70.5576266	33.16438671	62.87419245	67.78432868	30.96357466	30.0758033	28.0445846	76.63969091	107.7966814
19	13.60699508	41.82132401	54.03095906	27.17752174	63.33792018	65.37301337	21.03534499	20.24808088	22.35187247	69.49537292	89.16668143
20	13.83293429	40.5965418	52.97126176	35.41083028	65.99704222	74.92793482	18.03317349	21.96016933	28.92159646	69.40244923	91.12406763
21	13.15986068	40.18991521	53.78531923	30.42812101	64.61282655	68.01085328	18.93893173	18.87722519	21.06452375	64.83234265	92.70723315
22	16.23799235	40.95876155	59.34274525	33.48207959	70.00109861	70.61086815	23.89888474	24.66831782	27.32747062	76.20108983	105.1854369
23	13.02712963	39.06687152	54.02956726	29.77155498	58.76451261	63.49816573	18.48762481	21.44801679	24.58870617	65.52827468	82.45962323
24	18.56493483	38.07191064	59.41030067	30.63253888	56.36630092	62.83204997	26.73306294	28.26188997	30.15029821	76.51959153	94.04770886
25	19.54405403	38.24462753	58.02746804	28.88096571	52.61013531	61.25575841	21.63688044	23.43457502	21.61045788	63.30220899	89.13087009
26	19.52696334	37.49164492	58.06652833	30.11705063	63.85031057	66.43130525	24.0730276	27.50888635	27.57752415	69.51085334	100.6280452
27	18.6412367	39.29284835	60.3053328	32.77370581	55.34585306	66.14280207	26.68518044	30.2258389	32.39299236	73.61362078	92.63275454
28	14.43590901	42.34457026	52.97621162	42.00397193	50.04206807	64.9372165	19.22435268	21.01961673	23.0382522	71.52695507	87.93325456
29	16.56639441	40.08909707	53.21671389	31.20485015	62.20563873	69.24934196	19.69367306	20.22396646	24.49383326	69.09938312	89.41089871
30	11.53064641	35.46968473	49.30496632	31.07032141	59.11845597		17.05051547	18.08182483	20.07379409	61.81329629	87.49644703
31	11.98893378		51.46193079	30.76042004	60.50704747	64.18297772	18.88183333	19.56693994	23.13651479	61.30708481	86.71041787
32	11.43562708	43.8718024	53.111083	35.9847787	76.19632348	78.65327166	19.04223446	22.88637395	25.84043406	81.74726862	104.1083742
33		37.09280241	68.25780136	28.88843953	61.61193631	67.91564774	20.89553946	27.76751558	29.47292313	70.1270431	96.18735812
34		37.60972849	65.56422254	32.39848348	53.17827509	63.23647982	18.36836425	33.19836267	36.11221295	65.5515584	89.37797647
35	11.26855754	36.63385353	54.4793831	32.05708385	65.11053698	69.35189713	13.64792445	17.88962151	24.20938554	63.13437528	83.3587502
36	11.86033908	37.53858292	51.82198286	30.21563727	57.92579999	63.59533153	17.58895976	21.68749491	27.15472906	66.73504347	85.29219215
37	20.26745684	41.82872359		33.46605388	69.81489431	72.99358137	23.64825248	28.72903551	32.23937277	74.31743808	102.2754315
38		40.80444106		33.94139562	62.33106861	68.98412034	29.92527785	32.10375707	33.24336466	80.40850915	108.8243639
39		40.32838066	68.9256677	38.27178907	67.13235385	73.01162975	30.13908558	33.72494709	35.89212207	89.68912372	117.4128108
40		41.16074173		33.96882926	74.19336804	75.02875991	29.4964416	33.9470614	29.71011456	83.00610936	121.2833372
41	19.04655638	41.01650449		37.49835731	61.43584117	67.6839699	18.79841685	25.39915856	26.7623485	72.32675482	98.51455935
42	15.80443117	40.22224007	54.73258745	36.63305342	59.16722172	63.76535612	18.76721666	21.59700036	28.69468839	72.7684717	86.79692154
43	17.62373442	44.71660972		38.75425265	85.38754313	81.71827648	17.02530074	20.19215178	21.49980305	82.439041	119.6450826
44	16.93371627	39.61451308	57.50690655	34.12996181	65.4434755	72.80124948	24.21711567	23.80490447	26.12719028	78.4231432	101.089829
45	17.7749376	42.35303305	65.00784322	37.91827291	72.46554627	76.15049332	23.71914291	28.01529173	34.29205303	85.06829916	108.1708657
46	17.31256904	40.72524406		33.81284193	70.07833138	73.26547313	21.06155438	26.24158318	27.98995586	75.80513279	107.038114

	K	L	M	N	O	P	Q	R	S	T	U
47	12.5267778	39.61765616	49.84465417	31.0907396	61.14224526	65.15299536	21.22184694	20.31271971	23.88353346	61.64147326	90.2000287
48	15.0570113	37.92978048	52.63169961	30.05820429	61.08921639	65.81826316	22.15297278	21.89845735	23.52224459	68.68313795	91.24502476
49	11.08642254	39.82668007	55.15044257	32.84814596	65.80328057	65.31683619	24.31829642	22.50047884	25.36421624		96.74162489
50	9.835519444	40.77256205	51.23786453	35.54456326	64.54770226	70.81973126	16.16460167	20.50721272	21.88120722	66.23982236	97.28578289
51	12.53675582	39.45407679	50.49350762	33.54807082	66.46023977	69.66312598	20.69246754	21.78984538	21.92509001	69.52429443	96.46938368
52	11.85222129	40.25174677	49.08013995	33.19190226	61.7262251	68.38931726	22.2854574	22.179094	24.37075584	76.07189192	95.33270218
53	13.82267457	41.46987314	60.41795359	33.7004526	60.19767435	68.47765197	25.0670304	23.50555247	22.29084265	73.30751738	98.5011839
54	14.42447173	48.11552791	65.08885935								
55	18.61208008	48.46309081	67.00131824	40.99149146	89.76109952	87.6598743	25.51073396	23.88739751	27.7715399	85.28702526	125.1850876
56	16.02940064	44.96367507	50.41594714				28.33071652	28.53096288	30.15113079	82.02686876	107.9367561
57	14.2278516	39.79076214	52.22472909	30.21498439	56.26446989	61.59266374	20.04750047	22.34786252	24.52107852	68.75703432	84.6543471
58	9.352022833	38.96527689	54.83112006	30.48692656	59.41763904	64.31616438	16.55216788	22.12989675	23.51979095	62.95856027	87.3746248
59	12.59149604	38.15232797	52.50421758	29.66909187	58.97118317	65.41681743	18.4141076	24.69942565	27.07464206	61.94325202	86.1417673
60	13.33710304	39.55731846	51.42568174	30.76003009	62.63367804	67.09166463	18.95289046	21.85473403	26.32807926	66.94306793	89.34080744
61		40.05371854	66.3347041	34.45833715	57.77544773	68.23542299	24.53171542	32.84481031	39.61454135	71.71425339	92.70603116
62	14.5456952	39.91375278	57.96748008	30.74544563	55.51974339	61.90993489	20.84969379	23.19008275	26.19545615	69.35483263	85.38239138
63	9.576872405	37.26382524	50.80712601	28.46522978	59.35198499	61.26883847	13.26334339	21.03165135	24.67781991	57.63172325	81.10276383
64	17.02608831	36.8346285	56.25868082	31.4023426	59.04008498	64.30051578	22.19996564	27.51019481	30.48749565	69.14341921	92.6811515
65	20.00020497	36.13365794	61.43253872	30.91675935	65.93905838	68.98269841	23.16743893	27.82878266	30.52268993	62.89516114	100.905624
66	15.52936617	38.60962632	55.51073027	32.20582904	61.1585797	61.91821324	23.12589825	25.58216658	28.38291778	71.36647166	95.84289333
67	14.37014	39.50870081	54.85512246	31.95307116	60.88605956	66.62673734	21.45530872	21.40270581	24.11239376	66.68655493	90.64021866
68	14.35798817	35.36713473	51.52815496	28.10677988	49.4259603	58.67934147	19.61888178	20.49155191	25.69681325	59.80888504	76.45426218
69		40.19169995	71.41825329	31.63755704	65.09281876	67.55275242	31.37887903	29.48889296	24.47041419	83.01318903	107.7201868
70		40.08660596	70.30835155	29.60048886	62.94373382	66.72307832	30.21340816	25.97209553	23.97534437	80.27722627	101.2519363
71		38.61108218	66.76606419	30.49891102	63.95015924	66.22514957	27.85665207	25.95662248	35.35099521	75.49780152	87.27700409
72											
73	14.52926871	39.98232871	56.63496286	32.65704326	62.91229776	67.86342533	21.67383386	23.82319926	26.60336503	71.06534278	94.92431362
74	2.814464701	2.553304336	6.308338501	3.727333833	7.557460773	5.310255322	4.131171535	4.102834338	4.356221391	7.719376349	11.10754594
75	9.352022833	35.36713473	48.02088797	26.2025146	49.4259603	58.67934147	13.26334339	17.88962151	20.07379409	56.13203079	75.78995201
76	20.26745684	48.46309081	71.41825329	47.39522955	89.76109952	87.6598743	31.37887903	33.9470614	39.61454135	89.68912372	125.1850876
77											
78	15.83771275	32.69547385	52.23449022	20.40783118	37.59307058	47.61132449	20.99738024	27.06644592	31.1440107	57.0709784	61.35364237
79	13.29114324	41.55063189	59.04384203	34.05836721	72.54667716	78.75529622	29.73574913	27.51038301	31.7605266	78.62617354	105.0766221
80	14.67622658	44.92427761	61.17353204	34.20181638	72.78177939	71.48174441	26.21888006	24.84513121	28.57029227	81.00748478	105.0266734
81	11.77408889	36.60232626	57.17170194	31.09814884	49.01067794	53.27418606	16.55989843	19.51981236	23.74667739	62.53633363	77.60049087
82	13.17393494	40.50634755	57.10663042	35.93694397	60.47639923	64.74155906	19.12866718	22.04205371	25.55564124	65.24905586	93.09394588
83	12.82861715	40.49176428	51.20341501	34.05220276	67.5233171	73.90705173	24.57485875	23.91350166	28.66510518	77.10227882	98.56137198
84	14.5173684	37.30236658	52.50124983	33.6564881	57.28389692	62.64220573	19.63610091	20.41681177	23.07685531	61.95427677	90.8360385
85	13.08658529	40.25299722	54.13568154	34.65633444	62.21827238	67.68480292	24.03554587	24.02593193	28.40487284	73.44844918	95.10889857
86	16.5263443	39.98750776	62.54448041	32.15468931	69.19387064	72.52390032	20.18987643	22.47344156	25.43105162	75.0171948	100.0895451
87	15.39292265	37.45074384	59.10294968	28.33226864	69.73054499	68.72033436	20.03358873	24.01210077	25.66805583	71.52748422	97.8515189
88	14.30189941	39.63035464	63.52337955	35.66159812	67.71499581	71.44869703	22.98783708	24.59629462	26.13857524	78.38469035	104.4827939
89	15.34626572	36.40001818	55.63144895	30.14292301	52.48527447	63.68397376	20.50232513	21.17905372	22.12179589	62.47049255	82.43860279
90	13.53044034	42.22175279	65.1714355	31.06367023	63.38641549	72.7567521	25.61081553	25.74438064	24.6023854	68.08783127	98.49257364
91	15.31596609	40.43544564	58.77887888	32.57773437	77.06092751	77.05832041	19.79492912	23.14282452	24.72556113	82.07922936	103.5846145
92	17.34291968	42.94885594	61.86298818	34.08189844	63.77484798	68.86955668	22.89277115	23.02114712	25.91784408	69.70333402	99.28820436
93	15.29558473	46.79879908	63.34894945	38.025493	78.03656912	78.66603007	28.95468931	24.01987605	29.82351371	91.69364851	112.8528227

	K	L	M	N	O	P	Q	R	S	T	U
94	12.98867146	38.43911257	55.57761426	23.98962545	47.70567258	61.88590417	19.03026065	21.62091397	20.65614516	56.94517055	73.01201126
95	14.08291578	33.73677717	49.07822558	26.81548307	43.02553033	53.1130226	16.55094199	19.4141025	23.21194406	52.06004458	67.74840872
96	15.69129599	39.44499279	57.92817182	33.30682285	61.05507264	60.60268103	24.2564446	24.5729647	24.14619899	70.38538496	101.8647645
97	14.70272253	40.58328567	57.43086029	39.40733556	64.12862052	67.16677213	20.66581982	23.37053272	24.38958351	73.12826569	109.6192178
98	12.88547611	39.78093935	54.33501682	36.16695559	63.02160326	61.49571824	21.9704447	21.61225023	26.99742143	71.6011562	100.2030793
99	10.64190016	38.90845392	56.12638541	31.62185192	65.06763249	69.19829058	23.53187168	25.20188984	25.90782611	74.05656956	101.7547936
100	12.71816212	38.56838234		35.46227342	69.91672736	74.61252621	23.15061582			78.91943089	
101	17.13818218	41.27539869	58.58563764	27.42608052	68.94826905	74.59315643	20.89677424	23.0769567	24.47999203	64.44531032	95.21177154
102	13.08454758	39.97883682	57.38668052	33.48307018	70.57721854	71.46935472	21.67470167	21.41018401	26.08520916	71.57648758	99.88828021
103	12.69236663	39.53193207	57.08583978	28.58425967	65.79515166	75.14600825	21.3038707	22.81616513	28.13753026	66.8761595	89.99486081
104	11.38612802	38.47026166	48.91964848	29.33782418	72.57060098	75.43424008	19.24933678	22.63240569	29.32692393	68.11923056	95.23815977
105	14.64946296	35.68910433	57.81595315	28.93689703	53.39083215	57.84339662	17.69225232	21.16718267	23.50589015	67.50967932	85.82956676
106		39.25511164	65.60358409	29.79717579	51.91031238	63.74488783	27.16987541	34.15881993		74.01379513	81.43218268
107	10.15795677	40.61248517		30.67368558	61.06170637	66.65940231	21.35378561	25.63299067	32.45488497	63.4166513	84.53135034
108	23.84173202	38.92850988		30.19664114	63.35667906	66.91273137	27.90825635	29.82907867	29.30439479	76.76941671	104.6101448
109	15.24245685	40.12013815		31.71169792	55.54417321	65.25163631	18.39402889	24.16440832	29.68380875	62.18776226	80.01972221
110	14.27852444	39.10684055		27.63250503	45.93862039	60.35049801	15.57256458	20.14306683	24.39930501	51.32413253	69.78616124
111	15.22753139	39.02573745		28.69909518	60.24443366	65.69239192	15.8400906	23.00772301	25.15909148	60.4303628	86.16783621
112	11.78463384	39.12545868		34.82850778	57.48194222	69.35557995	16.22120794	22.77219518	25.797037	63.19943408	88.16557443
113	14.44877885	39.63007559	54.03039327	32.11220584	55.62196828	68.79499626	20.45638603	26.77182154	28.29767346	67.77982715	89.04034004
114	17.64747525	42.41376199	59.37416355	30.24439096	62.54872989	69.52178897	20.08619915	28.80828849	26.65063885	70.08010167	100.2106993
115	18.91384578	39.3612973		34.18132006	68.13766898	71.97670954	29.20743237	20.22938702	19.91509101	83.65312212	108.0146095
116	14.33408779	32.79736984	57.27766436	26.97998976	43.67208274	54.05427894	19.2228079	22.72764015	20.41478823	56.25852394	81.66754203
117	14.01196314	39.14018509	55.16220207	31.69327267	61.95978214	64.39745557	22.72261598	23.2924754	24.87244799	64.44749665	97.04123772
118	12.56863485	40.81433266	56.14225174	33.51721485	59.31741104	69.34918601	26.25718527	25.27421237	29.04252759	73.64540403	93.57621499
119	10.87810272	39.95475367	52.46338321	33.83091161	67.80849584	68.26265525	19.62637708	22.86630576	26.86221359	72.16068014	100.5326624
120	15.32557751	38.77318618	55.70762352	32.52051345	63.75916577	66.97289677	18.26600208	18.51677116	25.74530268	75.07929178	89.65562886
121	13.22748378	38.65579394	57.59495188	33.3681312	63.99007994		30.83359342	27.8458125	28.63118226	82.499947	106.0591073
122	15.04418528	43.68910016	59.1242055	30.72538363	80.03763572		18.73817289	22.47827306	26.84371683	71.0035293	104.9619189
123	13.98407471	39.47161347	55.43244058	30.12606958	68.38165875	66.15753906	23.45963585	23.49714778	24.79554087	61.31084859	97.37487665
124	14.74621526	45.40263332	59.95486939	37.17072863	74.6791746	80.09162633	25.38291059	26.10880344	32.93811112	73.56088992	108.507179
125	14.92361074	43.24006811	50.36000649	35.14106066	70.09103259	79.39136555	25.48489442	27.08312915	27.81287125	73.35041331	104.1763572
126	16.03936724	42.12122785	51.80478358	32.90461201	69.68952516	69.83283206	21.81537991	24.08332218	27.20618312	81.78547259	104.5448491
127	12.94659609	37.39933591	52.67146239	35.04266631	53.86501732	65.72992236	21.84197472	23.28284012	25.00061119	75.15591726	89.30772052
128	15.08896822	42.20445169	56.07050309	36.17394334	60.93480157	67.12502752	23.26438791	25.1390649	29.10827043	72.82957507	96.46933281
129	16.54001826	42.6483629	58.48585669	34.17905303	61.5203336	70.9170696	22.88643806	25.38159573	26.84744844	70.89354361	98.65173291
130	19.12975374	41.01425678	68.12320227	30.78838606	65.76329734	74.67715299	27.67795317	35.03220526		75.156718	98.57767715
131	13.96497881	38.98236774	56.46051024	34.63095306	60.61742151	60.33832094	16.15358117	20.23288446	25.29075548	68.15913934	90.19565138
132	13.8676777	39.31947471	56.66927486	30.91626968	67.41232512	72.05781348	17.41833914	21.69640753	26.6456333	72.00842352	92.83962566
133	12.99077042	38.12204582	56.72392378	31.34282851	58.19474373	64.48692914	13.99479113	22.90776365	28.13265769	65.53457345	83.43836107
134		40.30404338	69.13060515	33.76425615	62.76375111	68.0846896	20.65237381	28.93672658	30.17303644	73.09007058	102.6973183
135	16.11703067	40.92314321	55.74414097	31.55173776	75.17426917	69.85873613	27.6834729	25.77825419	24.67628659	77.84325148	113.2005751
136	12.32786408	39.7218197	53.81726733	27.67263551	35.59197661	52.0475264	11.97167372	16.40777806	19.86331087	47.72276782	54.23021244
137	13.54794376	34.97481964	52.85911049	25.48554462	30.60071325	48.23654744	17.63507291	21.17742582	19.44171155	47.69210287	59.47843422
138	17.12773442	40.46560972		33.23825265	69.60654313	70.76427648	14.97230074	19.74615178	20.08580305	71.957041	101.5200826
139	16.92270579	32.46098582	53.30831676	24.73653377	42.86064597	52.93111274	21.24814397	27.99143441	29.64879501	56.69791014	73.77405856
140	10.61150877	33.35211344	46.38459617	23.73244751	39.71247269	49.82537872	20.20711833	19.77113112	22.65624392	52.8553347	66.30745188

	K	L	M	N	O	P	Q	R	S	T	U
141	12.63060242	40.51443982	58.48685512	29.48969768	63.17243167	69.29314502	22.23287151	24.44405042	24.32344672	68.27628964	96.3121992
142	11.57233072	41.60785921	58.2688578	33.63783072	77.27560902	74.93377773	23.72415116	24.55088407	28.84185093	75.07449325	107.1119847
143	12.34250619	38.78263873	51.44162989	35.23276137	64.45226818	69.48998963	24.05916042	22.89550284	28.60912224	78.53547152	98.20182575
144	12.84977906	42.95894815	54.67766992	35.02502661	63.26380588	74.20453102	19.04410546	22.53762643	24.94435461	62.72230614	96.72147434
145	15.08578169	39.30164377	50.59286093	33.81595671	60.52691144	66.80069464	16.52191405	20.08013023	22.51900031	63.87125139	91.46214942
146	12.50238958	37.330024	48.10151987	32.71815739	65.16502846	66.14151779	17.98162813	20.49631455	25.04448244	72.31171641	92.54250219
147	15.08296334	42.81857837	57.70247503	36.8028251	72.40754782	79.15131234	18.97186875	22.80798172	28.46653473	75.4024641	101.7552913
148	14.96520375	41.22502458	55.95566963	33.7513692	67.77840651	69.74932278	23.01845765	24.03020758	23.90305123	71.36610021	102.8642295
149	13.90028913	43.1669605	61.4683865	33.20304205	68.24369947	72.45364161	22.98445629	23.84863093	27.06127726	62.69978288	100.1203261
150	15.51945439	42.36615764	58.22134963	36.88614603	66.75689362		26.02290598	24.55248597	26.51967103	89.73646892	105.8432582
151	15.70455808	44.53847889	57.29454294	36.96086734	65.42938112	77.36899299	28.93361264	28.80316428	29.53197819	77.84338988	102.7556889
152	16.29375514	40.4745919	53.99272592	36.62624669	68.40138567	73.35741814	22.70692927	24.27844245	27.32222733	70.73860437	104.6612722
153	12.55751115	38.81209165	53.32546373	34.25102603	68.34238544	68.57314631	23.82754615	22.33601549	28.95483378	71.37139266	97.84423595
154	13.99991529	42.57765975	55.47717104	37.168553	67.19184952	76.11830627	22.12040414	19.95419275	28.52624142	78.70463969	96.37046697
155	14.5238702	40.64746402	50.19727953	33.47628227	68.24750144	69.65036789	21.21283506	23.05214105	26.86126954	70.71726223	98.8421734
156	15.71111696	39.10432713	52.69884247	35.46444542	71.53246629	71.87824629	28.20098995	25.40900635		89.68843772	99.85811349
157	12.61796229	38.35884271	52.0342484	35.15255876	68.44752951	68.93043393	21.19838327	22.7130802	26.3439346	84.1449719	102.7432487
158	12.55642903	42.3072031	56.68635284	37.04634828	72.18042209	70.74187399	20.51168062	24.10476515	29.68674492	78.24418971	100.3015821
159	11.6134585	38.65589358	58.37977056	29.22581787	64.74334755	69.2164535	17.76524816	21.16438083	23.36472086	73.24880868	96.0488953
160	16.58158049	41.99474526	58.27916767	33.5867386	71.23548362	69.34064985	29.65291737			76.89133479	
161	18.54649156	43.50909336	61.13065584	35.56551833	65.84714918	76.20797789	25.38198416	27.98623448	28.29447747	75.66046174	104.5350229
162	15.84117568	40.41964188	61.52961369	32.4491539	63.84481679	74.19537203	22.15899604	24.40511957	24.58391671	69.7871835	99.43114279
163	16.0069221	40.37874097	53.66366513	36.59718472	70.06369763	71.73617824	15.97305794	20.07164356	24.40063278	66.23558892	101.0232491
164	15.62696893	43.31293958	57.91655623	35.11498479	68.25213799	73.77863361	31.42274758	25.83603836	29.39539709	81.25373686	108.1474796
165	16.90455072	44.97392934	64.13020069	35.93024229	67.45503493	74.57774578	26.83183573	26.767615	26.42027998	74.24003404	108.7348627
166	11.94347749	44.13519455	56.36677456	36.18510084	69.03712613	74.28797979	24.77824407	24.30918457	26.14297115	79.36233571	104.240648
167	12.42339956	42.23002464	61.68195089	36.65339717	63.52170295	71.00335785	19.09758743	23.92054453	26.99198458	73.50030447	97.07630358
168	12.04327239	39.82044695	55.5365087	37.35949388	64.41675416	68.95699466	15.86914463	20.87319149	23.76451949	68.30007388	97.58945145
169	16.12909584	38.55983637	54.05428363		45.61569819	59.35799337	20.4675608	21.86850648	25.088434	63.42781612	91.09165028
170	15.83520478	43.82481677	56.04048161	32.04829395	70.66682747	76.11188716	23.6682379	25.46644088	25.85271171	79.88882681	104.7408339
171	16.69730474	43.23612808	55.44514166				24.05387913	23.27618411	26.7267901	83.22645757	103.9004046
172	16.55499374	42.60712199	54.72793964	33.12104414	59.62887298	62.13235767	24.12217647	25.61988119	28.68872353	70.38512536	98.30738932
173	12.54124261	37.40694616	53.12674315	30.67306911	65.44044525	67.77358899	15.74005727	21.93860011	28.14080269	67.91402228	88.16314162
174	12.52601309	40.09761484	49.66706464	34.6634376	65.94189057	68.64234001	16.35022776	24.77316175	26.88147197	64.66216871	98.37054064
175	12.53818583	36.02824738		34.78945787	66.83010268	70.10606564	16.44176205	22.54955746	27.41602526	77.76785036	93.99901101
176	14.02642566	40.87636474	58.9612133	30.78243981	60.79330861	71.58696888	11.52342237	20.77012088	26.84268268	62.2525439	77.48018389
177	12.61886747	39.83917102	52.94406695	30.59887421	63.11591341	67.29894344	15.33561157	25.10737367	30.19062538	69.9490752	88.97296581
178	11.46470205	40.46928451	59.51613474	34.76142983	66.80479327	67.36502637	19.75833418	23.18863302	26.97123549	67.70607662	98.81347011
179	16.66608388	39.18959638	47.29650852	31.08388286	73.5884654	71.99670994	19.4953038	21.2100737	24.71600814	65.7083973	102.5547731
180	11.74825981	38.27900776	50.43104995	34.69262059	64.62782516	65.07137628	16.64978792	22.72736349	27.86702584	63.5677092	94.39534518
181	14.81593612	37.35712294	56.68144575	31.20486759	59.38831503	64.40761663	14.06873592	23.01940811	26.19515691	73.81021686	87.49839129
182	13.79828293	40.33023942	57.4069886	35.51547374	68.38850969	67.84733614	18.79474575	20.86989452	26.38733731	67.77361172	99.08547398
183	10.7626047	39.63844488	51.31386522	38.25657317	58.7410247	61.8118263	24.82678946	25.1479757	27.27285418	65.78879308	100.6539003
184	22.49177698	41.01785349	62.78741616	35.40195507		64.38071481	23.41616362	27.90602512	33.68673383	71.89824752	
185	12.94488781	42.22285612	56.93209685	31.16871755	63.60017976	67.97643339	22.08263724	23.86657599	28.91699384	67.64042395	93.23854199
186	13.57008469	38.97924402	53.99476488	30.71633066	58.87935003	66.29917745	20.67033155	25.55132926	27.45185944	72.71756781	90.6862962
187	18.48665076	41.21380189	62.80799186	35.60612997	52.80772287	65.33204298	17.03054297	25.14173272	30.98575078	75.91685066	82.9769322

	K	L	M	N	O	P	Q	R	S	T	U
188	14.56657285	43.04082723	55.21708428	35.7167204	60.29431307	64.81353022	21.82382321	26.47929631	27.09276496	77.94523262	98.98915409
189	14.85476634	39.67309378	55.91360063	32.13481883	62.93070086	66.64501656	17.99140424	22.93116341	30.84677779	66.65653832	87.62227714
190	15.59924702	35.85176919	55.83714425	27.50980261	45.92778748	57.45556982	19.34354881	31.1721189	34.51845103	62.43426781	77.41337469
191	17.45227849	37.55878078	59.61023801		60.01674696	65.10964838					92.66539205
192		38.86681091	65.49418501	29.34200953	58.92179105	65.31384151		26.65678737	23.84240176	88.6215281	99.55996709
193		39.55665916	65.95267815	30.61225497	63.30679936	67.92523695	31.40574545	24.59295529	26.68350589	85.18220298	101.1365638
194	24.0817229	38.03519738	70.52508851	31.29706985	66.10269374	63.05897574	30.40212394	24.07909208	30.31344255	79.03120209	99.86924248
195	13.52058483	37.07999438	50.76912765	32.81326809	61.13264868	64.55397759	21.65054859	21.82969357	24.30665929	68.6983253	91.08385598
196	13.49716031	38.35700495	51.93579781	29.1675499	64.59482095	68.13403913	26.39315396	23.37981976	23.85712273	77.0228009	96.9457778
197	14.94757007	44.16091712	57.98600397	35.88657574	72.45440594	71.19797797	23.34897523	22.7567832	27.54925546	82.11466572	105.8848506
198											
199	14.52925744	39.98181658	56.63546629	32.65725598	62.91225243	67.86277628	21.54674209	23.82310426	26.60266079	71.0653188	94.92398703
200	2.406394251	2.638735468	4.589751881	3.367803482	8.950572882	6.537316987	4.263215597	2.887337166	2.876742395	8.44920151	11.07546905
201	10.15795677	32.46098582	46.38459617	20.40783118	30.60071325	47.61132449	11.52342237	16.40777806	19.44171155	47.69210287	54.23021244
202	24.0817229	46.79879908	70.52508851	39.40733556	80.03763572	80.09162633	31.42274758	35.03220526	34.51845103	91.69364851	113.2005751
203											
204	12.0587293	36.28156492	51.58224768	29.86476093	53.10342014	57.7127035	16.86040971	18.67171829	22.10054901	62.70685988	79.88464679
205	13.95813277	37.46999311	52.91843791	31.26889502	54.0271515	62.47506484	20.84347444	25.66218802	27.55288064	63.43486137	87.465598
206	14.51966042	36.73916452	59.2631508	30.83518884	57.57415731	62.94888498	26.06449826	30.67757611	33.75381525	69.45358267	92.60067573
207	14.57141024	39.43628804	62.67064681	30.03345152	56.98221255	60.82995372	18.11214823	22.62418548	24.32422555	63.9300449	89.93066437
208	12.99502279	37.5326852	56.31714624	31.24365404	49.64799297	58.81852054	18.0917766	22.02397002	22.38309759	66.07307088	83.32909574
209	14.2599844	38.65333757	56.0786613	36.14635572	57.22175457	61.29500511	22.00810208	29.14303605	28.50085481	72.74272262	97.25154257
210	12.63790105	38.79271694	53.73079384	29.66834196	58.77237917	60.76071798	21.86687359	25.792847	30.11158462	67.95472026	88.46140628
211	14.81707649	41.16176662	56.30702352	33.85753393	56.9126441	61.0930116	21.21990588	20.28652528	21.95797706	74.69869496	93.02698039
212	14.74123452	37.66544903	61.92598604	30.01223154	58.43843921	65.00866003	25.37575548	27.66829917	24.13724382	64.85853617	97.41024441
213	11.48579673	39.73569493	51.35720631	31.40918584	57.83703401	60.62262101	22.94549773	20.65007738	26.56492872	70.49364779	87.49843701
214	17.44543954	39.1304038	60.18398471	29.62557495	55.92748695	62.64574152	28.25429316	30.34584915	29.84966667	75.81460488	94.26489866
215	13.74414269	39.10337277	51.33159658	29.4908974	59.58290039	61.34802144	21.73409806	25.29539251	28.86142492	70.19215333	85.57538776
216	12.98880256	38.29661026	50.53174459	31.07204312	58.33886539	60.43144721	21.08416067	21.3937688	26.46163401	65.7142391	87.57529859
217	12.37856055	38.45298976	50.61629613	34.79630786	63.75323114	63.39022269	19.2625815	23.37949115	24.23582572	72.16820661	98.70332898
218	10.54211191	37.72125539	49.79703908	31.73949367	55.65948733	61.49251293	16.16342638	23.50871493	28.93811071	62.84205511	83.09810941
219	11.12780942	40.33803652	53.01344566	35.22069274	57.58883916	60.04544598	24.75524744	27.57180662	29.64173305	77.21153933	100.7274893
220	12.06992202	39.38119947	53.4221213	29.07695555	60.32460826	62.39086523	20.52849081	24.53466398	29.03039699	63.80891434	88.23385307
221	16.14274086	38.00590889	57.45039204	32.76149322	58.87540273	62.25241288	21.20179534	21.15354752	23.65708124	71.84184646	93.32954496
222	11.77807747	38.25133064	49.00692183	30.32004326	56.08287903	62.40697174	22.06339946	25.32824033	26.91876689	68.02110904	88.81537527
223	16.28130252	41.40405236	62.19408922	29.83437864	61.94248224	68.87720775	30.30965106	30.10381024	29.56694939	79.97578603	102.2406443
224	16.05334841	38.81476055	61.00474635	33.39631821	60.27676074	63.82519308	27.33654537	31.78321389	37.09651104	81.86060097	97.51756329
225	16.22259587	38.3407144	53.44166296	34.02597657	64.10747768	64.74138294	25.51803718	27.75597793	27.82024601	75.90245284	102.9621531
226	9.809773826	38.47477054	53.62120489	30.57082134	54.46872392	59.08262893	22.14456723	23.24980022	30.02009199	68.34668119	84.13926897
227	12.06638351	39.05060811	55.6721816	31.58125499	58.99682521	62.66766211	19.08185429	22.19537051	27.51258642	71.58913613	87.17497715
228		39.44434781	71.12942144	33.43052697	63.21111509	69.24298799	35.46361727		38.26534953	84.02981923	115.09281
229	12.84906902	38.5271133	54.14131774	31.75191295	56.49198509	57.40800879	19.35056637	23.0217117	28.98368753	65.09898555	87.2336553
230	11.99526334	37.37061317	50.46704874	28.52114623	56.61829818	58.02408923	17.98439093	21.88054756	28.20275056	60.93873042	79.76469688
231	11.89770347	41.48541717	50.28416411	35.46822522	65.85499827	68.06372992	25.37758974	28.78334092	31.86177858	73.72184951	100.8239702
232	11.36108542	38.23166187	52.47274266	31.71700194	56.35554656	60.31520347	20.29745175	23.18822544	26.55565675	68.95981341	88.21772145
233	12.9711893	40.74897359	52.77991877	34.06666987	63.90800365	65.08114996	17.8962062	24.07240027	28.68118606	74.98085889	95.25811018
234	12.44706028	39.0412783	52.56762284	31.61643589	54.33602797	60.76269005	21.42842291	22.11718986	23.92628859	66.04912154	87.52459427

	K	L	M	N	O	P	Q	R	S	T	U
235	10.27398155	41.71431155	54.21621419	32.80923336	58.93756647	62.39946398	22.60426467	23.78907863	27.83801164	75.32816933	94.20918394
236	10.23377785	38.96422331	51.92089465	31.0004052	57.55194489	63.85872231	23.27988882	25.78123278	26.2155561	68.058445	93.74010715
237		39.29010676	71.40301989	36.99228494	55.77675723	66.5897918	37.32480434		40.70979459	84.21225102	109.5658406
238	27.82420172	37.5130906	67.61258062	31.24673671	58.69782925	68.03678004	26.78839758	39.95251929	37.89789207	75.29909967	109.8483617
239	17.11890394	39.63254527	61.11956433	31.04949329	58.88091854	63.91117473	28.56169201	32.38464869	35.76233651	74.32907657	94.57471376
240	16.20038363	40.02356919	52.85434392	29.8937417	56.09868667	62.09425732	29.69192647	28.88059148	34.47794063	74.09535592	91.75291669
241	13.4204454	43.75645232	58.34619448	41.24213385	76.26515891	72.78809036	24.35128137	25.71433634	31.90920877	76.20309718	115.6390472
242	14.14173922	37.13799442	53.96038891	32.01804124	60.51133243	60.77554319	22.20365723	24.06723629	31.20029166	66.8415409	87.12389874
243	17.42748196	41.27146341	57.9329375	33.58725496	63.22219845	66.49887089	29.54021387	33.84393573	36.46029769	76.59142704	103.088273
244	11.0516691	38.01972357	54.3380539	32.74267242	55.03577421	60.71312248	22.92561194	22.79889983	25.68058035	66.62216774	88.26540967
245	16.91953316	39.23917068	56.09334144	33.11209059	66.31387716	60.63951198	28.31494725	31.90021816	35.76561202	85.1779726	106.3023528
246	10.92069601	41.25392325	53.42101054	33.56698721	50.92241325	59.00725956	18.40201872	21.89727036	23.05316488	63.64424287	80.79688533
247	10.72869466	40.77321634	53.69120055	31.53157523	59.42216138	64.78984906	17.19647138	20.70967553	25.1779953	60.14489201	82.44166889
248	9.678857647	35.79656054	50.12432391	31.07345323	58.07762876	60.0702448	20.38271773	20.79778019	24.15623208	70.09186145	88.3052393
249	14.36190284	36.81218011	57.6388935	32.64326852	60.26068683	59.51413022	21.03385356	23.85902391	28.15803549	68.64491642	96.58247546
250	14.74222978	42.34319635	58.02885155	37.71573326	72.34170206	74.49603671	26.39676559	31.57785362	29.99388945	78.11438556	121.1173569
251	15.84817394	39.27559731	56.37271178	31.56221881	50.78059593	59.83151624	19.81519375	25.77462096	27.90864785	71.96374469	88.78661536
252	13.2630093	36.81629829	49.33374031	29.23431858	55.38732211	58.01490676	20.12402076	22.20533642	23.86732561	62.60613168	86.26834315
253	12.6839523	36.68168676	57.51889056	28.81495257	54.42576861	57.18595545	19.07444165	24.65885901	28.51955952	63.57163156	85.58476385
254	13.83357003	38.9835118	54.04944415	36.44919866	53.74480893	59.53295368	20.10724412	25.35824651	28.57491274	74.15001737	92.20148656
255	12.77219033	38.66530614	54.38339519	32.41820604	56.29843258	58.34718244	19.46113259	25.09226207	29.75412906	68.6623387	89.08131038
256	13.52895462	36.54375111	51.45105719	32.79171435	54.21832847	55.66294698	13.81813098	21.1750358	24.68291824	60.19245694	84.01835055
257	14.27952588	36.31733559	53.27141457	33.22692896	58.20579287	62.54526432	21.910523	25.68257646	29.39176506	87.46394471	94.79594794
258	15.31264403	36.8172561	53.05877857	31.83297162	54.52291206	60.59746846	17.51923979	27.42103877	31.91469691	67.82141641	83.53450335
259		40.86353594	68.67406869	29.62672494	60.34016409	65.29379159	36.24512093	33.21825862	26.79837519	85.32574121	105.682227
260	24.61107357	39.3858251	66.09231159	30.2200369	56.14225259	62.64039678	30.39444263	22.66869657	27.80713343	72.65399841	91.0432377
261	13.70391811	40.91372805	61.66521168	37.46954667	75.55411704	73.25525972	30.02898936	31.63266391	37.26050736	91.49841345	117.0315795
262	24.40341526	38.71278298	67.84760441	34.59812247	66.15673095	61.7178392	33.16681815	28.52362206	30.96254625	81.57492373	107.7631253
263	13.02744512	38.75917581	52.63927849	27.10747413	45.21987738	53.28085129	15.49185106	18.45832201	18.86227818	50.0443801	65.11740936
264	13.47226965	41.82271858	58.33613539	33.32630428	51.21046054	62.04443487	20.29993672	22.92965503	26.78195873	67.38924852	80.19651995
265	12.98497092	40.81156496	56.46728509	30.0098596	58.73819266	63.64005146	23.08823428	24.44448276	27.69291694	66.28847362	92.93625885
266	16.03780955	36.30335249	64.10442248	34.54868222	60.5418854	65.06723004	21.61887001	22.82164973	26.54725962	76.7413488	97.31695806
267	12.00159152	38.62046637	53.34757901	32.63514212	55.78787383	62.86043946	19.88308666	27.65014351	29.34410943	62.72495217	88.06163933
268	25.25546147	38.05006885	67.01924681	31.54720468	53.47191017	57.59103338	31.57316534	31.72352372	27.3146401	74.42175076	101.1077519
269											
270	14.19809363	38.93799645	56.39408236	32.2164382	58.34281836	62.32850909	23.12682753	25.60725049	28.70642153	71.13706245	93.21560772
271	3.592250016	1.689187882	5.560655792	2.518971927	5.362316924	3.944358395	5.145667226	4.231644222	4.379872504	7.60952805	10.19900324
272	9.678857647	35.79656054	49.00692183	27.10747413	45.21987738	53.28085129	13.81813098	18.45832201	18.86227818	50.0443801	65.11740936
273	27.82420172	43.75645232	71.40301989	41.24213385	76.26515891	74.49603671	37.32480434	39.95251929	40.70979459	91.49841345	121.1173569
274											
275	13.53617999	37.24527476		28.13972982	46.68024416	57.62836688	15.07632723	18.08000088	21.26552295	58.24721585	70.8221625
276	12.92659516	39.85401947	56.50695623	33.48071754	55.78063667	61.18441918	25.50045977	24.39742598	25.27193299	60.88964637	91.88128361
277	8.345216823	35.20119799	47.42611313	22.46795454	38.16846227	46.95603105	11.44919953	15.61799891	16.9707643	40.30983401	57.06057932
278	14.00338269	41.93776693	53.72043376	30.07907591	63.04403867	64.19332494	24.83380843	28.86697129	32.80756915	60.85623503	96.90509211
279	12.43955888	38.79854989	52.93829104	31.93329605	56.5591856	62.39455703	21.90058208	21.13286199	28.87463346	59.3833301	86.98382866
280	16.70680988	37.51468594	57.09695971	31.50963087	51.84650447	57.7420537	22.29251862	21.77393251	23.14387408	61.08126711	86.48482056
281	12.84257162	40.65223829	56.46983955	29.3340885	65.20450449	66.24547433	25.11594549	23.51127153	27.28774545	71.45495824	93.89023228

	K	L	M	N	O	P	Q	R	S	T	U
282	10.3933341	34.25551304	53.25681479	23.37849111	49.15948277	57.95321956	24.23309496	24.66616358	27.96152875	61.37647463	73.4278129
283	14.30140118	38.46837451	56.94211977	31.33223448	45.77760284	56.67546706	18.00534977	23.10353683	23.76061946	56.14053978	81.19782136
284	14.96624487	37.01980785	60.93854629	30.4649625	50.87373424	59.46458355	22.22131372	29.13369478	33.35359351	64.75694771	86.78142489
285	15.38854616	38.44798556	56.70253661	30.71872375	64.49944698	58.66969044	20.53287848	25.20505215	28.28855461	62.11109648	97.2169233
286	14.96374395	39.24676773	49.64548292	32.7993824	52.52953732	60.61771909	19.37145585	26.60324528	28.68152124	63.83637616	88.24918492
287	15.32263122	35.00306346	59.15040633	35.89251625	65.72185323	69.39708486	24.34750476	25.57093739	27.06282216	74.71495692	107.0683385
288	10.26281015	38.55605353	52.27067412	31.2703104	55.55285615	65.21985018	17.34733208	21.91044884	25.63380825	66.33567266	82.05574231
289	12.80693311	38.46922135	48.97918002	29.42102624	57.75204738	61.55592299	14.79441325	22.75352964	24.27981951	61.13877081	86.02959364
290	13.20178496	39.75250388	49.96391795	36.43193009	63.4798314	61.07880369	27.33740593	25.261874	27.0208644	75.71899646	106.6584643
291	10.72762861	38.62389589	54.32858281	40.22572702	61.82533372	61.15784806	21.94118051	26.56110699	32.37299794	76.59761423	100.6943404
292	16.18016034	38.99066046	49.30598048	35.05887149	54.7021702	61.14765999	22.15630021	24.59653256	29.41758582	70.53516202	88.77893118
293	8.600090719	37.2298486	44.67283981	29.2021282	53.85032012	60.72844293	17.88887466	21.64436592	25.45570979	66.31805296	81.01249999
294	11.14951299	38.17286526	50.03481162	30.98087404	60.02972336	65.87860284	21.24123458	24.68206971	29.96587016	64.6523147	90.07484267
295	27.37335053	41.66211296	71.37365863	38.07430012	63.53113161	60.22803282	33.50188553	35.21544287	35.16696439	92.06750163	118.837983
296	14.76491875	42.30138763	57.54682884	31.38548957	66.2615626	69.6333273	22.18745065	22.84769244	28.82387954	73.72229676	94.15534614
297	16.18205016	39.63547097	57.8223033	34.12592516	64.07843406	65.42312854	20.52352558	24.21674217	28.31433438	75.70157365	98.33124441
298	11.50212188	37.93516823	56.38490516	34.59069788	65.20100858	71.32033678	18.26854891	24.37246959	29.48252183	75.3637552	99.12860203
299	11.05117868	34.2738831	45.08337129	24.53781304	43.98983354	54.9397315	14.6980965	21.09292362	23.03391379	57.2653862	64.44303838
300	11.43607344	41.69493753	52.65956943	31.01322443	61.70793554	68.06264901	25.02749399	28.49197437	32.39937324	85.39896243	94.53003206
301	12.28438221	41.04220736	52.86312214	32.14053556	62.93422189	72.03336633	19.80484874	26.38151788	27.40410674	71.67622485	96.09859249
302	15.13596364	34.76987135	49.80986544	36.93429401	58.29262295	58.70909753	22.93015036	25.51744971	29.77248562	68.28080319	97.80465458
303	18.68096561	38.82509493	55.51599452	32.28008928	47.94361302	54.00913142	20.32628517	25.07302295	29.17641511	68.82076767	82.27509878
304	13.40961491	39.7939782	53.58938189	35.19509461	55.49638256	59.55274411	19.14497567	23.16924045	28.31465318	66.22122545	91.13433961
305	14.22586852	39.40135547	57.25182723	31.73518526	57.90470818	63.47015222	21.63731974	23.35366306	27.38202926	68.79950552	89.64013286
306	18.00396205	36.92444681	59.27639496	30.01847765	55.18239931	58.27068583	25.12125246	29.33829556	32.25913366	65.51569942	91.26369083
307	13.14122985	40.79583492	53.30777644	33.07202719	67.13513819	63.01412017	22.81682397	23.78965502	28.49223118	74.6326449	100.0143292
308	11.74147461	40.60516773	56.27705973	32.9722987	64.29231709	62.44238567	22.77309115	24.46488289	25.18090346	67.85238531	101.1392865
309	12.04099477	41.86107054	47.96661134	32.74990516	63.18767786	66.67525459	25.44148396	27.39174303	29.02706707	77.44302885	102.643988
310	18.3302687	38.64727281	58.23154521	34.5824153	52.87958255	61.31107922	24.97181017	26.8759432	31.65157819	72.99295925	88.97795307
311	17.19495706	39.89045554	60.05114482	28.79365029	61.72545333	63.29940882	28.69778299	30.2209366	31.29156924	72.34575107	99.88474419
312	13.56319593	38.13711546	52.57500537	33.00961687	62.43982281	65.51003129	18.39629584	21.12718253	25.74904357	81.96913843	92.99529556
313	9.489532098	39.24744714	49.76666023	31.87026772	66.22039374	62.57233367	23.5970206	25.7375167	29.94643988	62.70187038	98.6250017
314	12.75167593	39.68577328	50.19044393	31.58069871	68.17174579	67.52615156	30.1353523	31.11049675	26.86060087	67.52949979	112.6822126
315	14.46186379	39.48696685	56.8704961	31.35568256	58.14154474	64.74956015	22.53303186	22.89634771	25.42546768	73.00039792	93.78666512
316		40.55189278	71.5582917	33.45115327	68.03230047	61.74062176	32.43329054	35.75899322	36.47647526	93.3714905	115.4471757
317	16.42653107	37.70887867	59.48699766	33.15490743	60.32938802	66.44542551	26.110579	31.68757142	35.86664957	69.22393774	97.60403218
318	12.70958979	42.73454032	54.33086958	39.22058265	63.2009813	64.60642442	27.38451619	27.81727858	34.56700376	85.67550872	103.1008323
319	15.11475548	42.59041415	57.7381998	37.39211566	62.16868999	59.78960966	16.78189465	26.09475809	28.23216326	70.1999298	100.3507133
320	12.94423732	36.96677278	54.04702253	31.56335332	66.86703131	68.95311258	18.51682618	23.41519527	26.69328394	66.70678423	96.72781477
321	11.49072909	35.66670406	48.81162619	34.30278966	60.93646804	64.5270187	18.28116738	24.00342601	26.55439783	74.03056243	93.89052242
322		36.88194917	66.31524076	25.13240348	41.6845063	54.34486109	33.64092659		34.18640137	71.9135518	85.36627791
323		37.9519226	68.41133857	29.43943585	56.1407972	61.3228836	27.26812726	24.21514477	25.35922195	77.55013584	95.77869544
324		42.1964503	73.30641518	37.19799924	68.12521823	72.38577201	34.49891258	31.34376611	28.88679483	94.48904002	119.2930092
325		38.39192445	71.71238111	31.22324328	59.84108967	61.67914523	27.8194711	30.64264469	30.12132881	81.33205307	101.3995247
326		40.28040338	70.43697033	31.10734577	66.26793973	65.88634261	32.27112763	34.21047218	29.34144337	84.58518866	116.4087735
327		39.43566765	71.28523477	32.29716637	57.37412279	59.85551513	30.41310104	35.01603337	32.2475834	79.54985277	107.1214895
328	17.89892848	42.18199951	62.0773209	36.6660684	62.08170395	68.45584755	20.32694982	29.43402631	36.67601995	72.75018993	92.10449562

	K	L	M	N	O	P	Q	R	S	T	U
329	19.41823367	37.19467815	58.65691959	34.93480885	60.51392052	59.69632577	27.74588502	30.904687	33.27060764	81.53837549	105.7995776
330	16.77278762	39.63538051	54.41942297	32.69020564	61.53807126	61.93071873	25.03857731	25.05791769	27.19725267	76.00541086	96.99156872
331	14.01417911	40.66146608	55.03368356	33.56988421	63.8647131	65.83300314	20.68333868	24.7256303	30.36495948	72.91772094	93.77041904
332	16.07112806	37.83432713	59.99971798	30.14589159	63.82288309	65.70636198	23.31508783	26.48562935	29.5322016	76.44131874	98.49780686
333	12.52629073	41.0516964	52.93167473	37.98782423	61.5852866	67.73399185	25.04833796	26.24908213	29.69726147	79.22983175	104.0757174
334	10.2380604	39.53947653	50.38511838	32.60585205	62.2067971	63.7522981	25.67635748	24.28457117	25.91901827	73.97368279	99.78561071
335	15.95852186	38.43203101	56.39088634	42.40018276	46.21844751	57.98975746	10.54552591	24.66691494	24.89049077	74.57332046	88.86812457
336	18.71943088	40.58042261	55.51386309	33.90255748	58.90994306	60.9986461	29.93308958	30.7137239	32.50729384	78.29376469	102.0723172
337	12.45098663	40.80504219	54.56987557	37.34120694	56.96893705	63.09810919	25.61666883	25.87711745	30.89005217	77.62052488	95.0511067
338		39.1767467	66.06957622	26.97228384	53.66475982	59.32338239	37.68642858	30.31462046	24.52027517	84.1276532	97.74243947
339		38.19499335	67.02259709	33.29740059	57.65786664	61.76435902	32.69280276	26.35504663	37.94988983	80.39240435	88.75505611
340	11.36871213	39.4475586	51.69334134	32.41464304	65.06709404	64.91601333	26.4669096	23.24191495	28.58809678	69.12214084	97.48429895
341	23.22729483	36.91173793	64.75014068	32.75939375	58.41326361	59.40903276	29.5508075	26.4850562	37.79611422	73.24557461	88.88793709
342	10.1951158	35.88971859	50.23797547	29.67116704	56.08643857	65.16831652	19.18152678	20.01203286	25.0099338	67.35432747	82.30727086
343	12.56620905	39.16115818	57.77270907	28.73287575	58.45383169	63.06967988	16.13348813	22.30893561	27.2999699	62.1569375	82.6609126
344	14.98089228	36.60644926		30.09019992	51.12198037	55.64134525	23.82790344	27.73987531	33.92046007	64.90268913	79.11327241
345	14.98381829	39.87911596	53.97527424	31.40004299	55.69066442	61.47207052	20.35412113	26.00463804	28.28271656	69.47413714	88.0043702
346	15.38304576	41.16503196	48.12875528	30.2979913	58.44969704	65.37628021	19.76984681	25.26360386	28.9491417	67.90330822	85.43732252
347	16.86629816	33.79220769	58.83450206	24.36413905	46.09354643	54.95935931	19.46334682	20.14347984	22.33520765	55.32361041	73.36330655
348	15.19762444	37.88989999	58.69682152	29.31182557	54.76612242	61.52640147	16.18517417	23.51495434	25.32012676	65.60720687	84.92863288
349	16.86270395	38.71110795	56.5073168	30.10848094	56.29872828	56.95076372	21.44929505	26.22936422	26.94386083	68.48483114	91.76458152
350	14.24971902	43.34544489	55.68422992	39.2301377	64.64795556	65.83539816	23.06564184	23.06280041	28.42455761	80.5887444	105.0850481
351	11.16149126	35.85984822	54.70968364	26.8025537	45.49746938	56.73781861	21.96558978	21.60878952	25.17947975	56.7339981	69.91612142
352	14.01823297	41.83458024	49.65502184	33.56277603	60.37618792	64.15762991	16.63790992	19.10175308	25.07499519	75.52559603	84.24529141
353											
354	14.19777288	38.93842248	56.39370354	32.2164391	58.34252627	62.32924967	23.12695201	25.60713778	28.70647155	71.13682276	93.21625151
355	3.195496946	2.151215078	6.571969574	3.736255248	6.732298753	4.497975824	5.356065716	3.872409764	3.904193672	9.244445483	11.51259306
356	8.345216823	33.79220769	44.67283981	22.46795454	38.16846227	46.95603105	10.54552591	15.61799891	16.9707643	40.30983401	57.06057932
357	27.37335053	43.34544489	73.30641518	42.40018276	68.17174579	72.38577201	37.68642858	35.75899322	37.94988983	94.48904002	119.2930092
358											
359	13.09937356	34.4665653	48.98563275	24.99130528	36.07516009	51.54653392	17.46698246	17.67504452	16.85410209	53.22227914	60.78571558
360	12.00949365	34.38858714	46.59519125	24.05204881	35.73753349	48.46108597	8.468577026	14.21143389	17.91643259	41.7687138	49.16130392
361	12.58495126	32.45068711	47.42576309	25.02881741	31.59418776	46.97854092	16.05525311	18.80767478	18.45745748	49.39117953	58.70135567
362	10.93071215	33.7553506	46.67377074	26.73367213	33.95700473	47.70490045	12.43760839	14.92565048	17.41935317	48.21803012	55.09495398
363	13.33238439	39.52945341	48.09723726	28.58909176	43.67498557	53.81610018	10.43198198	17.01549033	21.2957051	52.26634325	61.58963029
364	10.93442469	33.66935519	46.65033231	26.91451254	34.28931415	46.27055975	8.810126905	17.47086384	19.27426249	41.81102686	54.30257233
365	11.79464102	33.18035755		23.75617657	34.36345589	49.16826459	12.69278181	15.4190902	18.12911367	45.11869456	54.61701114
366	10.03620816	33.04675128	44.15509064	23.76716548	30.35547817	45.98057675	8.61978605	13.26416371	14.78399667	44.29804824	48.66166274
367	13.94547501	39.51696023	51.37834666	35.84194657	41.47035046	55.88615061	11.53994818	19.67419614	23.15874684	63.54964355	66.01907197
368	12.18159865	38.29665038	49.50055859	28.35109872	36.63108258	50.68997853	11.31138037	18.73313703	19.80656885	52.14290774	60.36005245
369	12.80816761	33.72731127	47.68122565	22.88541808	34.71638925	46.81301638	13.9498039	16.35651056	18.79834389	50.62285683	54.62482487
370	12.67976889	35.78630485	48.13606761	25.70458979	34.40565429	49.31517693	12.21765863	15.18515196	18.34315718	51.84546012	56.15387566
371	15.7696806	34.638944	50.28270158	22.25494748	34.8517515	48.5684299	14.82732566	17.86541191	18.31060015	45.63924758	55.36979088
372	17.06988349	35.96675451	53.099795	23.8269545	37.53658935	50.61760103	17.01959753	23.70896809	25.09671614	52.91869153	61.5858694
373	11.91838605	36.24431792	50.65177997	25.10459432	30.17453225	46.62733739	13.96849511	15.08153552	16.70342874	49.24007981	53.80193455
374	15.25142225	34.74686106	49.9497915	24.67074354	35.75068676	50.18566999	16.34074998	16.86421118	18.70276268	55.61286257	56.68687919
375	12.64421572	35.30916974		25.14106629	36.64838453	48.82598401	12.52182732	19.10843635	21.74818367	49.90870436	57.86851896

	K	L	M	N	O	P	Q	R	S	T	U
376	13.88539574	34.43263293	49.53593968				12.45419529	15.31728903	16.65745122		52.22187497
377	15.99345706	35.18338926	51.42237881	23.3885968	33.40437338	49.05873742	16.27090092	21.28436473	20.49337835	55.71896218	59.00857468
378	15.68693805	34.28934749	51.27914445	23.44610697	33.72001965	49.15870552	13.52297114	22.10224165	25.9769439	47.18941964	49.5302957
379	13.43621615	37.96643921	52.45341633	26.20115581	39.20012363	54.17332594	19.47516644	20.21913991	21.23050953	57.69035456	66.313152
380	13.10177454	36.9365195	49.58630638	28.37623704	36.31261205	51.0910903	14.28700699	22.22424197	26.652278	49.21547354	59.86266731
381	16.59860869	38.90562532	47.58623539	31.44659808	42.04483903	55.46573692	17.41089193	21.3557202	21.22213095	58.38430394	75.91455905
382	14.14282184	33.88077397	45.34158153	28.74529936	29.74016051	48.00957999	12.75262312	17.30188307	16.63175175	45.3951564	57.71588668
383	10.18825174	33.39869761	45.67104615	23.19166426	31.07814219	46.98737572	13.51605535	17.53334378	18.56524087	47.77949631	55.85669339
384	11.68304142	38.73451375	48.06941522	27.52409876	45.36400088	54.77785672	13.87598532	20.97174292	23.23326682	55.10990866	69.05896491
385	13.87796068	38.35090868	48.84028166	28.88624858	41.58594486	56.33697097	18.21200713	22.52510187	28.52402736	58.22595129	63.45793092
386											
387	13.24389826	35.58515664	48.76196121	26.1084675	35.94933681	50.0967418	13.72065511	18.22970517	20.1476263	50.85706908	58.30835641
388	1.887089158	2.1733749	2.268606558	3.049930804	4.165026421	3.170472406	2.911765362	2.841606904	3.425916122	5.415884565	6.19454751
389	10.03620816	32.45068711	44.15509064	22.25494748	29.74016051	45.98057675	8.468577026	13.26416371	14.78399667	41.7687138	48.66166274
390	17.06988349	39.52945341	53.099795	35.84194657	45.36400088	56.33697097	19.47516644	23.70896809	28.52402736	63.54964355	75.91455905
391											
392	10.60142519	36.20728093	47.9625109	25.304036	36.10712249	52.91326192	14.13214215	19.28684341	19.86297492	58.00078574	59.78524591
393	14.33078275	34.73128005	48.04733262	27.13926705	34.1192728	46.99251281	15.85052424	17.15458032	18.93004006	51.38751953	59.99173716
394	12.2392968	36.09016307		26.25526254	36.95515942	51.60472309	10.98988016	20.32412557	22.32822803	50.05105706	57.21045945
395	13.94222759		40.19562475	26.34199829			11.05763534	19.01271058	19.79597375	54.65386407	
396	13.26030593	34.10999954	47.16345468	23.59486589	36.87124914	49.29946778	12.36520917	15.16686657	17.56099795	45.84196614	54.80662937
397	14.05766697			27.69791131	36.8441495	48.03985312	12.90934582	16.6130828	20.52142501	53.72462791	57.76512617
398	9.597906368	34.33779978	45.06092035	24.53799645	35.26946531	48.95554279	8.53416057	15.13798087	17.17262388	46.46270107	52.18250662
399	17.04752725	37.5668305		25.2740187	35.70149989	50.70933967	16.25026334	24.30479557	25.67761088	49.97122306	61.5592499
400	14.12689767	37.33398329	55.72379196	29.28959189	38.60368573	53.17881551	13.63683208	17.61521692	19.88964818	53.23454464	64.06869003
401	13.24192697	35.36937489	49.67987226	26.72596235	39.2567757	52.57957408	13.75105114	16.99131554	19.72062004	54.22579562	62.43202931
402	13.39062305	35.75612027	51.01707201	26.93752192	34.8959061	51.94783143	16.95548737	18.55710522	20.3641029	46.80758165	58.23751188
403	13.96513652	32.53312138	50.22363795	22.70000494	27.6119302	43.88528204	13.99445728	14.86441699	15.98552854	41.67126959	47.07457557
404	13.04680808	35.76798191	50.70547588	28.23837189	37.8042041	52.5416817	14.31138116	20.3952274	24.7545421	56.45914118	60.67417869
405	12.56860313	37.21860612	50.82263404	25.48049313	37.30183709	48.61602733	17.34888003	19.79043272	19.50827545	49.50096208	62.21049427
406											
407	13.24408102	35.58521181	48.78202976	26.10837874	35.94940442	50.0972241	13.72051785	18.22962146	20.14804226	50.85664567	58.30757187
408	1.751932583	1.482653663	3.941265341	1.787340028	2.893045473	2.772329377	2.466835418	2.575057528	2.659601096	4.564486004	4.691167641
409	9.597906368	32.53312138	40.19562475	22.70000494	27.6119302	43.88528204	8.53416057	14.86441699	15.98552854	41.67126959	47.07457557
410	17.04752725	37.5668305	55.72379196	29.28959189	39.2567757	53.17881551	17.34888003	24.30479557	25.67761088	58.00078574	64.06869003
411											
412	10.77724073	34.19281995	51.3530355	24.65203114	50.18574211	57.87615911	20.02785146	20.50891907	23.47567454	60.86166099	75.08904568
413											
414	10.77724073	34.19281995	51.3530355	24.65203114	50.18574211	57.87615911	20.02785146	20.50891907	23.47567454	60.86166099	75.08904568
415											
416	10.77724073	34.19281995	51.3530355	24.65203114	50.18574211	57.87615911	20.02785146	20.50891907	23.47567454	60.86166099	75.08904568
417	10.77724073	34.19281995	51.3530355	24.65203114	50.18574211	57.87615911	20.02785146	20.50891907	23.47567454	60.86166099	75.08904568
418											
419	16.10201761	32.11355748	48.00970954	23.2165662	36.02559713	46.89827117	13.29014579	16.79993634	19.36011998	52.14426626	55.97665986
420	10.55451704	31.51458675	48.45910335	25.57795729	45.37347974	51.99058976	17.50873164	20.7715192	22.97551048	57.11700066	70.43080802
421	11.71027509	34.45317955	49.38867641	22.56011837	45.67912743	54.9802293	19.86782638	21.43427618	24.70055216	50.89527042	69.9353264
422	11.15175105	31.12602706	47.54697295	21.05026462	34.4252446	46.971845	13.9376535	18.0307083	18.42424721	51.09702358	57.21103187

	K	L	M	N	O	P	Q	R	S	T	U
423	8.7584266	30.78641226	48.69412478	24.41526273	41.31118455	50.60477215	17.8635224	19.14167969	21.92043985	51.33098053	64.81374025
424	10.01071164	34.9855244	49.94211443	26.43673081	49.40721974	54.54873698	22.28146616	21.73326565	21.68051319	67.5174414	79.46770766
425	10.30270127	33.9870425	50.60857743	23.58987353	48.29859531	55.69942656	19.37394034	18.90003339	23.29999652	56.7430403	71.70093823
426	9.767960556	34.38764917	54.44616986	24.90218093	52.06809427	59.86606884	23.2286192	21.53936353	24.56967085	61.66199233	80.23755781
427	10.50802565	36.88216298	53.03094285	28.36864716	60.86576097	66.05785173	26.69863564	24.00451124	27.99621915	68.93465763	89.61048024
428	12.20272717	37.57360397	53.90366111	28.06834575	53.46335671	67.57120077	20.61631798	22.44221	25.24930002	73.10981575	82.51638647
429	11.72692751	33.58184112	54.33429309	24.37220415	53.60600388	63.0721255	22.69605671	23.04492196	24.87193125	64.96598996	79.80375644
430	11.84458631	32.47562709	52.04432988	20.97985179	45.28683503	53.92236979	18.64335873	19.35403207	22.51441338	50.69141507	67.04346355
431	8.950576275	34.49993186	51.83498307	24.1096606	53.94936479	59.99789738	27.08751558	23.24662797	23.58878012	67.50900263	84.16223934
432	9.663158404	33.548802	52.31561335	21.8121608	55.29175849	57.90117207	22.12322074	21.34914852	24.72561688	59.17388643	75.54040592
433	12.87733711	35.58820027	55.10473572	25.47660965	55.67582857	60.32329096	19.51492316	20.7868628	23.58591109	65.02577356	76.75854153
434	12.20474372	34.68617955	52.24984736	25.9965106	52.12434622	56.666236	22.62194998	19.16868312	23.99336121	60.93519983	77.68942483
435	9.674713454	34.99851121	49.86293295	26.10015178	54.61193785	60.08954456	21.05057046	21.54220678	23.65969875	61.37749866	82.49816938
436	11.39801746	34.7830312	49.31020369	27.3406929	50.03932926	62.20133432	18.18305239	17.96546495	21.04362873	57.82977428	77.54296011
437	10.07457857	34.98766061	52.3263241	22.50873074	52.57899595	62.51085928	19.23378209	20.2159321	22.4541889	56.80174487	75.23775144
438	10.10823954	33.36390592	54.59091635	24.28997095	47.79223086	59.28497547	21.87434449	20.91212805	23.65135257	61.56628795	72.54218247
439	8.280224145	34.95803799	50.79883373	22.88207678	49.58871286			20.87683091			78.61077214
440	10.21520321	35.43256639	49.64414526	26.4602242	55.77416883	62.61624293	21.41702402	21.88304843	24.4964407	72.93019954	82.50146127
441	8.419043258	34.9375425	49.19947054	24.29154199	47.21922175	59.85031255	17.63791108	21.06275638	26.38402735	56.9874789	66.72107561
442	8.545949998	32.69207568	52.49075133	23.5719156	53.84179649	55.46097668	18.30826118	20.15415603	23.41127403	66.44891914	77.63654995
443	10.95242736	35.82563968	54.15629749	28.44030539	56.71970803	61.68216687	20.51194019	18.46929116	24.82575746	67.26986495	82.10618323
444	11.74881794	35.6011255	53.7484758	28.67054388	56.39416753	58.37101495	21.11450914	21.53016755	24.72676408	68.9560934	85.02650881
445	13.07307398	33.51162941	49.25962189	23.08370202	50.44039637	55.62769397	16.65999154	20.19832557	23.97175761	57.21129274	72.42845235
446	10.93450986	34.11041447	50.57265791	21.67404971	47.36369989		17.39961925	17.69435833	21.782704	57.02930369	66.75150215
447											
448	10.77718721	34.19258816	51.35266022	24.65167325	50.18629154	57.87566175	20.02758851	20.50901593	23.47645102	60.86152646	75.08935847
449	1.682101246	1.613960102	2.255668503	2.262169468	6.047854131	5.17556846	3.181383455	1.775356949	1.984671921	6.765840731	8.112295605
450	8.280224145	30.78641226	47.54697295	20.97985179	34.4252446	46.89827117	13.29014579	16.79993634	18.42424721	50.69141507	55.97665986
451	16.10201761	37.57360397	55.10473572	28.67054388	60.86576097	67.57120077	27.08751558	24.00451124	27.99621915	73.10981575	89.61048024
452											
453	12.37463333	36.63996289		27.17556526	54.79464345	60.96675771	14.08802789	19.39707479	21.46113855	57.8720437	80.40245269
454	10.74333661	37.10610674		30.61221062	58.33802217	63.44109935	16.00264868	20.07427905	26.26654248	69.10678936	80.30860198
455		35.64777704	47.88862353	27.09403129	52.31800062	62.29599995	25.81949533	24.7082707	25.28480894	69.71315746	84.22035881
456											
457	11.55898497	36.46461556	47.88862353	28.29393572	55.15022208	62.234619	18.63672396	21.39320818	24.33749666	65.56399684	81.64380449
458	1.153500973	0.744809635		2.008098809	3.025721726	1.238312303	6.293694983	2.890827049	2.538902743	6.66832272	2.231854857
459	10.74333661	35.64777704	47.88862353	27.09403129	52.31800062	60.96675771	14.08802789	19.39707479	21.46113855	57.8720437	80.30860198
460	12.37463333	37.10610674	47.88862353	30.61221062	58.33802217	63.44109935	25.81949533	24.7082707	26.26654248	69.71315746	84.22035881
461											
462	14.44666381	33.45271217	42.35936125	29.03838082	51.48375371	55.88639147	12.70702717	17.43556401	21.53349427	64.36874143	75.26504786
463	10.37796416	36.61182814	47.82953816	27.03826872	47.5847144	59.01545234	19.57178152	22.21992669	22.71556547	64.12798355	77.17137308
464	15.14929983	36.27869532	48.71840711	26.583052	56.08288445	64.15061781	18.37688703	22.21342242	24.35332873	60.52689939	84.440882
465	10.35656968	35.31896699	46.53131031	28.2200335	53.26692127	60.80393247	17.2303785	20.21152582	24.30207393	60.42998503	79.87562644
466	10.00877142	41.64339234	53.40032736	32.63086323	63.77567093	64.57926308		28.30769465			96.21217548
467	12.55371325	40.0195944	55.52003607	30.94454455	63.43630044	65.79001475	19.31265613	21.02320868	26.42863437	72.12773636	89.39123477
468	13.14641866			30.37759314	59.32458613	64.7731609		23.47041259			83.10039061
469	12.67568626	40.48168161		26.43992093	57.514577	60.25903001	21.61610468	22.4491659	25.15460602	72.45790191	84.08899494

	K	L	M	N	O	P	Q	R	S	T	U
470	13.04785566	38.50921071	47.53762917	28.37162687	66.98674673	74.42029961	23.47343086	22.68366232	27.86055641	80.83079764	94.02190404
471	12.16354026	36.88174772	45.07269211	34.53586553	58.43945222	62.73285935	16.87486975	21.37651851	26.8528915	61.73429384	84.72202556
472	10.69042943	36.25570211	49.69827518	29.00253185	61.35562393	62.74254601	14.57661533	18.1256852	23.97578912	57.4836534	83.71166261
473	11.12894977	36.75101358	47.24576499	28.30775771	49.9535329	61.69117639	17.79048408	20.71600581	24.22227188	70.63392574	76.25476003
474	13.98190299	37.07556542	44.44982929	27.47200097	46.81135864	58.3647257	21.63433664	20.76397249	23.31149992	55.38738154	75.86230383
475	10.28488018	33.88525191	46.28090883	25.39339105	56.91664964	61.41644549	20.53466645	21.65883796	23.55547437	64.69783371	83.42162382
476	9.20509341	34.55276414	49.40063302	25.08958206	52.35215208	63.11878931	19.85644673	19.53388081	22.60774545	72.39170238	77.82169083
477	9.090717466	34.58625886		27.13905364	55.09576242	62.55754566	15.51349279	19.92021027	22.68309335	62.94439413	79.16525126
478	10.51581581	36.28195227	48.81564602	27.19748544	47.37772609	63.36904382	17.32488918	20.84480935	23.64876968	67.15369707	73.86607756
479	9.628885421	35.64567741	45.32668838	27.20433699	53.03295684	59.82721965	17.34752739	21.10850273	24.3307577	66.13604809	77.01114031
480	13.13721472	34.97271768		27.90593486	50.99791174	60.04058936	21.1124983	21.72790074	25.4901551	61.34768411	78.62425658
481	9.587541442	33.62173737	48.04255187	27.06556874	51.21874704	59.16419874	20.60637756	22.07602983	25.0429838	65.37448321	78.86082563
482											
483	11.55889568	36.46455106	47.88934994	28.29788963	55.15040143	62.2351651	18.63669278	21.39334684	24.33720506	65.56417459	81.64446236
484	1.850586364	2.306226938	3.241480885	2.327027579	5.784217296	3.783717969	2.747567024	2.196248278	1.610853456	6.245134475	6.087813672
485	9.090717466	33.45271217	42.35936125	25.08958206	46.81135864	55.88639147	12.70702717	17.43556401	21.53349427	55.38738154	73.86607756
486	15.14929983	41.64339234	55.52003607	34.53586553	66.98674673	74.42029961	23.47343086	28.30769465	27.86055641	80.83079764	96.21217548
487											
488	12.97714615	45.12652717	60.9578615	48.50252523	86.30421917	79.74080114	29.28637971	27.20498374	33.19517755	99.82750849	136.0037921
489	15.57738753	40.20118183	56.16148843	34.50040732	60.55055125	65.71527038	20.30125102	21.8932612	24.79242379	64.29997723	97.96704667
490	17.08297853	42.49666291	58.76562614	38.62216636	68.20178785	65.74804353	23.29060556	25.4067971	24.94551506	79.34620428	112.7203708
491	16.92941374	40.98249613	59.09278358	37.95146465	64.14952693	67.02106103	22.54237814	21.91600783	24.83187454	78.34770344	104.0185056
492	19.70180454	43.90304506	70.91819018	45.97041462	90.82573607	77.04180505	29.61484942	26.076831	29.20025931	93.34245042	141.7115802
493	15.80590963	39.38469115	60.45045736	37.21329768	65.31883062	64.63116461	21.73732363	23.78759372	25.34206165	73.15633029	108.6596037
494	15.45762685	40.3592642	59.63438818	34.64709696	63.84438395	67.73368048	20.19183121	21.61111024	26.66423064	69.71050189	98.7185488
495	14.80615639	38.66693938	57.28837711	38.23035837	66.61558366	65.93423658	19.69410633	20.66362114	28.08187037	72.89682266	102.5457394
496	15.99002848	43.76594984	61.03006356	38.9350519	65.91889462	68.40958152	23.26661747	24.71526892	30.39396902	76.89445676	101.2627668
497	17.8646035	42.49152508	60.47393767	37.85019233	66.2471119	68.56881151	20.94228845	21.89698843	26.37220325	78.38364436	102.8112896
498	14.92327458	38.7732033	59.72580604	37.16600413	69.09819753	69.83348124	24.75875476	23.8340522	28.15630689	77.52821008	107.2607735
499	15.6910736	39.97657271	58.44059307	38.0171841	69.50338888	68.45685505	19.7681661	21.63030706	26.60086615	74.27806844	101.9764239
500	16.31957847	41.27827244	60.27631064	38.37134925	64.05343667	66.10923921	23.14015342	23.30246737	27.07053226	78.02969408	101.1805466
501	14.97622878	37.70159812	58.7408118	37.93397146	64.74012469	64.74075632	19.11359731	20.50790965	26.30333273	70.58854527	100.9927016
502	15.96966759	40.91070475	57.55256445	36.82505667	65.24222679	62.60792942	22.35211529	22.44075401	25.20588546	68.00961412	103.8094482
503	16.78788894	40.83957681	55.47230688	34.19777979	65.06810144	63.42798846	29.18182763	26.33490413	27.5406719	78.60983671	107.0806409
504	14.93789279	41.32755765	60.84811137	37.51732943	68.70643947	69.69646391	22.91780002	24.37022286	26.14717553	80.75729231	111.5536058
505	14.94008198	39.03361704	54.29918888	38.04671104	66.39892564	65.57613207	24.43131293	23.01615107	28.63474101	79.9898055	105.1234392
506	16.99094205	40.86435317	57.93176528	39.69558896	65.80522685	65.22608602	23.17805813	20.53295469	22.75506029	71.13843892	108.6671163
507	13.63179927	38.13219774	56.40116526	34.91978717	67.61350363	63.75465439	18.88794635	23.03894799	28.15567366	68.37234102	100.9254154
508	25.58970477	41.41871762	68.31404335	37.26807843	60.19770434	65.27555193	29.73386911	26.98635816	26.92784185	81.04008763	109.3380001
509	24.88434293	40.73991542	72.89210002	38.08236521	65.14441755	66.73864149	25.71786313	28.74359203	39.13178312	77.4290953	97.48624742
510	25.51820106	41.2365942	71.15212721	37.99128231	72.91271706	68.34280958	33.87937708	31.243319	25.39392809	93.24953919	126.1751416
511	25.49131141	41.60903182	73.37063453	36.46028409	65.54690436	66.97933958	33.13913109	29.86620417	28.28937992	85.47507224	113.2374439
512	26.50297202	42.11713804	69.47396538	37.89071366	66.91480584	68.25710196	32.43846851	31.05725436		83.06145128	103.7999176
513	25.55622415	42.14480524	71.50102067	39.65742156	65.92370156	71.54087086	30.20508073	28.33841072	28.4488218	87.28104116	114.6310778
514	12.71889631	42.485987	59.43512289	39.41444714	68.92762349	67.26220589	23.59841423	24.4621988	30.69563056	79.91276952	103.1072595
515	16.73485652	42.41861321	58.03201843	37.77497299	68.71995375	67.51710132	24.8783863	25.18775605	29.26032427	79.5995139	109.5499842
516	13.52932174	40.24442023	58.91864008	34.61911519	66.42711762	64.41810248	22.28960455	24.83451707	27.82629933	75.56237121	104.7967746

	K	L	M	N	O	P	Q	R	S	T	U
517	13.68943102	38.0374266	56.18878287	31.84754618	61.74073461	61.61306005	17.91062536	20.66972728	24.72396938	63.49894049	92.26188918
518	15.08403005	41.23547338	58.272331	37.23580829	63.90880294	64.62997371	22.74034893	23.19086884	26.63012047	68.41427264	102.2686839
519	13.7617594	38.53549887	57.25797572	38.61223248	67.33957018	67.44688484	28.59546264	27.37358885	26.92066006	79.22469624	113.8559198
520	13.67091805	39.35246615	60.13088034	36.63943355	62.80257819	64.64589448	22.57383854	22.74483373	26.98885903	75.80659421	99.85725654
521	14.74543404	40.418766	58.25537893	36.31464594	60.74989922	61.03352885	20.79371627	23.21529167	24.64962754	69.8621837	100.1470647
522	14.50674087	42.05614482	60.27780187	34.93865464	63.82762761	67.78548804	21.62922602	22.09656629	25.48160289	73.39961294	98.86515156
523	17.64089236	40.73380588	58.88817291	37.99299492	67.4414505	65.64488857	19.37599016	21.57416504	25.66561415	75.29996147	101.7015037
524	14.0144689	44.27942066	63.82403637	47.28271481	89.28958245	81.74664796	26.12562205	27.23172287	33.0332149	96.90937797	137.3376008
525	16.48590703	40.45333105	61.02209019	39.26802102	64.95813209	63.47975577	23.37176759	23.87344986	27.31157719	77.12881932	105.6280782
526	22.08763193	40.72702829	69.33168734	39.37682464	67.97843863	71.14263211	26.44819009	23.52718858	29.07453349	88.13038958	108.2585309
527	21.09783512	40.76611982	65.299819	38.31331277	68.80512783	69.91152374	25.84777083	22.61635646	26.99758305	91.73732255	111.5648081
528	13.81385072	39.57887194	56.98272199	32.91192025	62.38510518	59.35481539	20.97552292	20.85969747	25.58029775	66.96532871	95.31428559
529	14.60886018	41.8181153	60.08247326	38.65173455	72.64577462	67.03688121	25.4228351	25.94431648	26.10778319	75.05046562	117.9917572
530	22.02804583	42.05881762	66.70075981	37.2642829	62.59073206	65.52527111	24.99271366	29.17890724	27.38080856	77.96508719	111.5391171
531	23.30185337	43.76835017	73.15083796	36.77140799	72.54650393	72.20858385	38.9393079	32.43345818	34.45195043	92.40234589	122.0459919
532	21.48626482	40.31031719	70.18815387	35.03382821	63.25752248	65.90380931	27.41521809	26.35949306	27.21741226	79.37567426	104.598848
533	22.23987408	42.53315206	67.63181445	35.50953546	69.61058433	70.06530935	26.5626181	23.90286681	27.05597079	80.78924517	110.3073887
534	21.42571239	39.89346735	69.20801449	34.80881293	58.94578101	65.25973767	27.16644464	26.12907228	27.10969412	71.60646958	101.6216084
535	21.9796079	42.22772977	69.95927852	38.60371729	70.18663304	68.91728355	30.31204222	26.46392932	24.69057884	79.59261319	119.0378738
536	21.69841104	40.04332265	70.87253752	41.72217883	63.84989594	71.01629338	30.1204755	27.38153133	28.11661309	91.42378312	114.3852834
537	24.46813341	40.74610038	70.1286814	39.37923926	66.45949617	67.11599739	30.64487419	25.51937466	27.53906906	84.36064023	113.633379
538	17.46462107	40.0674856	58.82545776	35.87519727	66.88132732	67.8740107	22.88736987	25.00879591	30.44303519	76.05797971	103.9223003
539	16.13377792	39.3712101	55.36510033	34.47007026	65.42012731	63.1220155	22.28379951	22.48956654	25.97072876	64.45905958	100.5634024
540	14.62002405	39.4829802	51.42729326	35.79154729	61.21750171	61.84283649	20.45283974	22.59357528	27.16264775	69.28275971	95.82717662
541	14.87102973	45.71324248	70.63243827	37.93086526	65.29807409	71.86780298	17.29424194	19.99962807	27.56206459	94.4688414	79.82682483
542	13.94808821	41.59229142	59.82442444	37.04361675	67.7316012	65.92556848	22.2857868	22.01938055	26.68759307	76.7962671	104.4233378
543	16.05935226	38.68763626	56.24812943	34.77077501	59.3210263	59.38778462	23.03378453	23.93395422	27.80282128	69.48168976	96.47587055
544	13.53258456	41.5452505	56.71417335	36.72459581	65.24508581	65.95606573	27.89790012	24.95483395	27.31528777	78.37456451	109.3368409
545	14.10736131	39.91635972	56.91034623	35.06443681	60.06727057	61.00395007	23.1950958	20.88341708	24.33345973	70.67774152	97.75939092
546	15.04910013	41.7968522	58.99690492	43.18854733	54.73376637	57.64314085	24.60582982	23.85260692	26.44425669		102.1426857
547	13.54364418	38.21930697	50.09216735	32.18527374	63.27632955	62.07301295	22.26544069	22.22569198	26.25778395	73.94779181	97.36644818
548	14.71251859	39.37453439	55.92580168	31.07900986	57.99786389	60.02106895	20.77257032	21.35934928	24.1938278	66.19470967	92.73085416
549	13.15126118	40.48841961	57.187442	34.60798101	62.82597228	63.19744844	23.20251634	23.16681781	24.78044623	73.96335791	101.9941896
550	14.02822502	39.68239509	54.49558655	33.08467876	62.85034434	64.9242454	22.74121944	22.07523626	25.87660373	72.76333806	99.62533041
551	13.87313172	39.8910541	57.97444021	35.47562539	58.02465583	61.28727933	20.00272809	20.98011085	24.77744418	69.84708615	95.11501409
552	14.09338178	38.1592113	54.79346421	33.61822638	56.71039464	62.48755917	20.0859646	19.76799651	25.84022964	64.43237681	88.83761692
553	12.83692214	37.03713921	49.78320951	32.78471106	55.19530973	56.92251276	19.72172509	21.33220267	24.13296372	62.38824718	91.79268014
554	12.98595839	38.81861669	53.81968014	36.59680314	61.89576884	60.44951337	21.90007673	23.07410239	26.65703832	80.77205824	101.5331908
555	14.860112	39.22681789	56.50551763	34.85471057	66.74200984	62.48587638	21.98613639	21.36801149	31.5024696	69.89768122	95.59497632
556	13.29812785	39.17391467	54.96475828	36.57332773	63.87991364	62.68867743	25.94101892	24.1472155	27.04033127	78.81865897	105.3589586
557	14.95503911	39.5225818	56.72065682	40.07361931	58.74376198	61.27742209	23.16237738	22.82630736	25.12845764	80.13308488	102.6707548
558	14.80867045	40.64448439	60.18332412	37.81174128	64.10736394	64.1284325	25.00690138	23.10710525	26.913307	80.68610909	106.3359364
559	13.91768456	37.56884466	54.81768393	34.78106702	61.08486413	62.38909193	27.08761042	24.79058061	24.34994557	70.92791869	105.1971054
560	13.60169907	43.3539868	62.6266521	46.90348004	76.60664275	68.92312971	26.35521073	25.99860585	31.22546579	86.18873692	129.5317187
561	15.24468998	39.46315633	54.5553516	34.83378532	61.81096574	59.32816025	22.31172995	21.22179225	24.38177141	74.49282379	100.0309907
562	13.40453187	39.89521169	57.42984119	37.19779131	59.15266484	60.93327897	23.43590373	23.22816065	31.7855202	72.50942584	93.84327238
563	13.89762516	37.3332744	58.77562793	33.98910695	64.15972668	61.8102981	20.40530669	20.20630766	22.66575947	71.95038697	100.0860703

	K	L	M	N	O	P	Q	R	S	T	U
564	14.47399611	39.25658482	55.41485961	34.27022565	60.01471417	60.11955905	23.06655069	23.07363068	27.63421851	67.58709527	96.22883566
565	12.93091189	38.42196395	52.0333665	34.85370034	58.39756923	59.76453824	22.09244939	22.9792326	25.81084237	67.72354912	96.63624132
566	15.31589401	39.01229441	52.86755837	34.1275021	65.09940199	63.44805865	21.80004291	20.92266709	25.37297907	63.02676256	100.6409847
567	12.98580792	42.13874653	58.38245899	37.77186371	67.9934011	67.71702756	26.2766486			78.06657561	
568	14.72742229	39.43329214	56.15907198	36.13295331	65.08636493	59.6553564	20.58628479	20.95868611	22.33067872	73.31808854	105.8176246
569	16.74152082	41.73648406	55.74016257	37.73515368	67.14911107	68.69340547	27.57988793	25.18135158	28.74733615	82.42472732	109.9937575
570	14.66991813	39.18443895	54.37960873	35.4611507	64.5799115	62.39270986	25.39429604	24.52659023	26.11468446	80.98944305	106.8914829
571	10.87690285	40.17947543	56.78845462	36.34662361	64.50706865	66.3959952	22.42511296	24.292875	28.8952575	66.35442059	99.58937155
572	14.14814081	39.06895182	56.93895205	35.72950512	61.86956197	62.78456166	20.33660743	23.13659814	27.43177808	73.48200896	100.3565022
573	24.67233771	41.54507974	63.96117181	35.53885977	68.31252775	66.24164467	28.3049424	27.65096888	31.35562158	79.85939981	106.4831486
574	23.72077271	40.70203134	66.7509336	38.3549893	61.09952558	64.71334342	30.14242644	27.59047991	28.48585902	84.73215963	110.2672567
575	23.60368419	42.09916671	66.93817876	37.90682444	61.24633898	62.82903472	34.38824607	32.95367407	28.45235654	86.54816971	116.1830227
576	23.99584272	41.2205301	66.35216529	36.43646022	67.27793185	65.94435088	30.17879879	26.82799261	28.27153167	90.03332911	112.986803
577	25.36932201	43.4537547	69.92148015	39.66521775	67.27688153	68.33545682	34.56245228	31.20371346	28.01037531	90.39926057	119.1553651
578	21.57239714	37.4207287	61.18671888	36.92226379	64.02138154	62.27417848	25.51016551	24.7255184	25.45009583	76.3870636	108.0161877
579	24.98506681	40.26615662	68.5385424	34.11133459	62.12129167	64.22452811	26.91937977	28.54154433	24.93499431	77.03125928	105.5747876
580	23.25965535	39.80309014	64.04753553	33.09922366	61.61856885	64.38085563	29.92225272	25.96071276	25.91565763	83.59251201	104.0904978
581	14.23047693	40.01834434	53.0266072	38.89392164	73.41413472	68.17142632	23.72290796	23.57648801	28.74616086	77.57575923	113.889548
582	12.02933535	38.12577806	56.63704746	37.25056823	65.07781128	65.78888834	23.32599511	21.73709897	29.25002729	77.40512405	101.2096292
583	13.03966946	40.8134407	55.98628008	35.6947431	63.10394125	62.78267544	24.22420462	23.01798038	28.10941641	78.34287018	100.5759077
584	15.29523508	43.69475179	62.4363523	43.35198908	91.37923558	82.11763854	26.84884457	27.37095154	33.08200288	85.57495464	135.7009138
585	13.15848905	40.0702935	59.85371898	38.80602598	62.80932728	59.88841409	19.33040675	19.93223523	25.79193717	68.04411883	98.52994777
586	13.08269372	39.45813256	56.31484439	35.08864877	63.03185979	63.63765375	21.77783665	22.44493619	26.38712724	68.7535198	99.83500854
587	14.61234389	41.9448184	57.83899797	38.96042897	69.76859546	69.40127379	26.3825244	25.92361372	27.98170398	77.56947085	115.6950991
588	15.29033888	43.40648234	61.98289647	37.06084194	68.69322701	65.91784919	23.85927309	22.76114202	27.80327098	76.23699219	106.7882599
589	13.81050155	40.16375005	59.638738	39.76505752	69.5392674	64.94856589	21.88300021	22.56256753	27.90532446	79.0577504	108.1264682
590	16.12695221	42.04701088	56.49700641	39.42424429	66.48377131	67.73245014	20.90163693	22.07483355	25.90745785	74.80586039	105.3954168
591	16.5922022	43.88411199	61.9819316	43.40539389	73.58164684	69.99643661	23.05164892	21.91727944	31.37956276	80.09666873	111.9509261
592	13.45456322	39.94219447	52.51788601	34.40900897	68.5686086	68.81891726	22.54165681	21.77013296	26.88691675	75.90255203	102.6484581
593	15.1428318	41.39173065	60.25329433	33.70168821	68.41593131	67.61977438	29.00875369	27.70276149	25.98549356	84.03165269	111.9855952
594	16.42133309	40.0831798	56.816343	40.42403004	67.1449353	65.50381271	22.71841911	24.17958555	26.91727352	79.80471459	112.2128115
595	14.84162497	42.62264508	60.31408957	40.71970148	75.33433861	74.80102337	21.81998996	24.80283834	32.93645593	73.7002049	111.8401401
596	15.10888642	43.67922492	57.94683451	34.91430433	67.5823393	63.5061785	21.85867136	22.771696	26.28737439	72.52932201	103.114717
597	15.45476114	41.87303739	57.91901119	37.70812141	65.70152096	60.29133763	23.46474347	23.3402393	25.99469283	78.08118689	106.8343635
598	16.58239001	43.61640035	60.07646569	40.69690936	72.82250109	66.43954873	24.55927758	23.8274321	28.81034561	82.14658256	113.6805721
599											
600	16.69411137	40.70278596	60.191358	37.25046247	66.01212608	65.72088901	24.44621252	24.14580502	27.33669277	77.23445488	106.1471074
601	3.943534768	1.777928268	5.552204923	3.050170686	6.104088094	4.422341376	3.971829926	2.829658497	2.565175622	7.705861849	9.764276602
602	10.87690285	37.03713921	49.78320951	31.07900986	54.73376637	56.92251276	17.29424194	19.76799651	22.33067872	62.38824718	79.82682483
603	26.50297202	45.71324248	73.37063453	48.50252523	91.37923558	82.11763854	38.9393079	32.95367407	39.13178312	99.82750849	141.7115802
604											
605	15.20167518	43.98298459	55.32929694	39.64240994	66.57979535	65.31836672	21.86538524	23.86491885	24.94184697	84.81004542	111.1182258
606	14.7778757	38.90562495	52.58163906	39.83956553	72.19382625	71.1109285	22.41471335	24.15393046	27.38124373	85.40252659	114.0700034
607	19.3779592	41.27486144	61.5457748	34.10152019	66.70483818	61.73917095	25.66512937	23.27692659	27.1186349	80.33174988	104.7680005
608	15.62838954	42.34139758	59.39764567	34.2667709	64.79137996	65.57764132	22.32471522	21.61979577	26.93729004	75.78587837	95.92784531
609	17.111841	38.69920735	64.22245741	35.42006991	68.32027016	70.99638261	21.73740406	22.47447065	27.22892445	76.4484679	102.8312538
610	19.4838991	46.51009808	70.15870626	38.96112613	65.26899836	69.10257852	32.3109391	28.44152146	28.80170554	85.02776732	113.7171617

	K	L	M	N	O	P	Q	R	S	T	U
611	18.1752175	43.65439577	67.13506609	38.25123631	72.26169903	75.10731126	27.87082536	23.75970823	29.86677674	93.759528	113.6615015
612	16.91855289	37.3585794	59.37179835	38.62913167	66.71121247	64.58337661	27.09671498	22.64879392	27.97022888	71.96326841	106.9986099
613	14.47092904	38.63022087	62.57010315	40.01639787	68.78884885	68.0710184	20.22159117	21.40431684	24.52122578	80.84533448	108.9255198
614	15.36978341	36.83145847	59.8575258	38.18278232	59.9275327	59.31199895	23.77212518	21.82950637	25.47686919	77.89727898	102.8573606
615	16.66180844	41.77877792	56.20241756	35.62496747	69.55166133	66.60572959	20.98269357	22.2436411	25.35012285	80.27937569	107.7695473
616	15.97284324	41.77927236	61.68023902	38.5599093	75.05719013	74.1461874	26.0671509	26.1638714	28.04322539	80.76986256	118.6248051
617	14.43202271	39.11645814	58.71531409	37.60785846	73.36317872	67.83688159	18.83509667	21.84168401	24.04721862	77.54803793	109.0623011
618	13.7424536	37.7158473	57.78190698	40.0120903	64.21410785	61.38469851	19.66850604	20.23909362	30.58079952	70.81912818	97.53223665
619	15.27757048	41.55380976	62.57582471	42.18208637	73.17115232	74.3420807	25.22927164	24.68044949	26.89962187	82.80690885	119.1927599
620	25.66109933	40.78547391	71.02038421	38.77686668	60.68464224	67.14897938	27.22360086	27.03170862	41.13690552	82.97797728	88.59109005
621	25.78081985	41.50242279	67.52091597	40.17487021	62.21296248	66.26256924	33.15729101	28.02034285	27.0144674	94.86529977	113.9666946
622	25.44242392	41.05603019	70.84007776	38.90780273	62.69493166	65.36519976	26.72976893	26.2641094	40.56924224	84.3341354	91.69830227
623	17.111841	38.69920735	64.22245741	35.42006991	68.32027016	70.99638261	21.73740406	22.47447065	27.22892445	76.4484679	102.8312538
624	25.96615545	41.31909441	66.21064299	39.46612293	66.43311515	63.74262873	29.28552995	24.41946042	28.57372164	90.39230496	111.1228365
625	12.67694481	39.4860706	58.09510723	36.82913084	67.67946718	59.25654697	25.37730258	25.21819373	27.84210878	72.34677355	109.4019767
626	14.74078438	43.03071233	60.92153981	36.09691016	76.85966833	74.63398085	23.91513112	23.81520441	26.41446176	73.66748018	114.8222156
627	18.2012914	42.41081251	54.87281601	40.09376287	65.10449525	63.48133363	22.30066869	25.40824197	26.50244309	73.45088926	108.4545425
628	19.77067553	43.39520745	61.71200695	39.60060551	73.56883641	73.99734036	22.57246281	24.48177748	26.11113791	80.49575827	115.9802075
629	12.61278537	40.86907881	58.14847374	33.88103144	60.03318537	65.17505096	15.89532829	20.97751818	27.04814704	63.09255375	86.41690425
630	10.79226217	40.92488881		38.15070084	69.71187955	67.62156312	22.25975598	23.09431621	27.88986994	66.21171917	108.6647007
631	15.08221964	40.59886767	56.77750197	33.87513976	69.68112583	67.57103901	28.25124456	26.83537631	25.38321945	71.0333038	112.3246666
632	12.69661605	41.6449776	56.21604058	32.15299959	69.06986159	70.33477647	23.70246996	23.42229747	26.59581845	73.49013477	103.6089479
633	13.09330567	41.41945106	57.92695096	34.15797805	64.96609192	70.47631616	23.5047757	23.45032031	27.45569984	61.08239707	98.28434926
634	13.28289685	40.3868835	57.81298923	35.31360822	64.82374994	66.12221436	20.03377838	22.23749835	27.62516197	66.28323689	98.80211817
635	12.17017349	41.59026264	54.63791195	30.5961002	68.68883844	65.72385012	24.95809798	25.55930903	27.54701641	66.25477096	100.1130972
636	14.19247889	41.71632063	57.2692251	33.17235697	68.01953367	67.96586585	20.81315443	21.58950091	25.94738235	70.6559109	98.05516803
637	13.25453908	38.96231991		36.11676758	58.22204683	62.53424835	26.34905128	24.98764974	27.17754803	71.80557355	97.84082296
638	11.83257323	38.7762387	61.14449948	40.40584726	60.86971622	65.299681	19.59083472	24.28704382	24.72898855	78.26507535	103.1672831
639	14.89176786	41.03142234	61.67355529	38.18479544	74.38674875	74.63961768	22.53149927	22.08441645	28.524264	74.93279238	109.3027597
640	14.04291945	40.31618946	56.37598305	37.03923282	63.8576156	62.97450988	19.83883364	22.77107415	24.79032262	66.79201944	103.7066059
641	15.09143761	38.91604154	58.1557946	37.18230172	64.94925295	61.63292122	20.71310964	20.08246649	24.59049315	80.05139419	102.3994208
642	19.38270563	37.13865569	57.79714117	29.2346338	46.92432982	53.59769542	20.15756269	19.13162787	19.48091327	64.49614338	80.92985149
643	26.02763594	40.51914335	72.09807869	40.72711828	69.46207146	72.85004163	26.5419254	23.31736593	25.82689715	93.0998018	115.0957148
644	19.5993592	39.79952261	62.48942684	38.85113292	66.95234962	68.12876305	23.12257121	20.61748498	26.62133656	87.82004164	105.4232513
645	19.14082199	40.30248317	63.85495044	42.71730478	62.79689337	68.78105972	23.29803381	21.96639462	26.92201148	84.36527972	104.7993817
646	19.03557215	42.04921545	65.67540309	40.41769225	65.3237094	71.39889349	31.14602045	28.05894207	29.95984156	89.6523756	114.9378748
647	19.9416264	40.78749664	65.2225308	33.02606578	58.26424861	66.25169411	28.15307563	24.04671641	26.395992	88.79271014	97.60355587
648	22.00552363	41.76628083	65.39192752	33.64135247	66.8251978	77.04444251	27.80518982	25.73285109	26.01489515	82.85430845	104.0379997
649	10.34226541	39.66693552	58.28497206	26.01522877	60.07837823	64.02143759	24.77123773	20.59210792	25.76934159	63.15400278	86.26675862
650	21.76666771	41.58704388	61.16568981	38.26236993	60.44989217	68.52012681	23.23612004	22.55867122	27.34486213	86.16313252	97.9527645
651	15.70478559	37.4734016	60.52367973	37.36065656	68.151334	65.12185108	23.22127195	25.72681879	25.43865955	72.66483241	110.9061796
652	18.68564254	40.27089221	58.24093941	32.28500994	59.47243605	59.41226574	15.85564757	21.11119474	28.21825271	67.18430404	86.60925481
653	13.32309552	37.25077307	59.36750986	39.75970337	64.07955423	67.22009911	21.40825241	23.66010761	23.91870947	67.98939514	107.7251087
654	12.6490738	39.04557608	54.09958733	36.39264495	73.90713817	68.85366922	26.15960487	24.36792885	32.08758398	76.06304337	111.0259547
655	16.38714162	41.30182247	59.19598341	38.22360108	72.33026387	71.33634456	21.7493936	23.78658044	25.4297552	79.94458534	112.271044
656	12.73393805	41.14802007	56.22956884	36.62621544	64.39069577	61.8983096	28.49815325	35.15428922	32.7266564	73.32160589	114.4243457
657	10.88933725	41.31436642	57.24994922	41.86606456	71.60477725	67.37723328	24.71316068	26.50691901	30.86496229	78.87290474	112.2212868

	K	L	M	N	O	P	Q	R	S	T	U
658	12.28718826	41.80274795	60.06553857	37.60908693	67.88623277	60.32649914	26.30341694	24.39447423	29.6627256	80.84372767	109.6384137
659	16.12347493	41.71130034	60.67753804	39.04720201	81.36082044	74.46561038	26.91506985	26.11018489	29.47875729	89.14552733	125.8835751
660	16.30080925	40.67082469	56.51404661	36.5919493	67.66112651	64.52413	26.25024446	24.52635584	29.38276032	78.30257605	109.391682
661	16.97946416	41.94147434	60.90782577	36.06172018	63.055782	65.33143005	22.87717922	22.51098594	25.49101318	67.72204126	100.9868506
662	15.29981376	40.72456392	55.40527066	33.89322115	66.90668795	64.55690732	26.4721769	24.151876	27.05552504	76.02499616	104.6132507
663	23.41228223	40.82045588	65.9009912	37.41904399	68.88345993	70.76671267	27.96194813	26.32077987	28.47151715	84.39512995	112.4875924
664	14.17828407	41.63152085	58.90771308	42.91224179	68.63474205	68.0247784	22.72733163	22.68387988	26.80721776	83.60383831	114.9902529
665	11.17743229	41.30503471	56.02212913	36.83475493	64.59946232	66.3266131	19.19352762	21.48715181	26.57739222	74.19185741	101.1591895
666	25.35368171	41.30385781	64.59253648	36.51354969	70.05143066	67.42229892	31.14403069	24.97705288	27.63203727	93.83552046	116.3056119
667	21.39196296	38.78672243	66.96992412	36.71375008	57.61303094	64.80308375	28.97535112	26.80708406	27.36164512	82.86163407	105.3280471
668	25.65598016	42.30918838	69.54761945	36.83505009	65.51429439	68.44645629	35.28376274	28.40417064	30.03702295	86.27966355	112.2544892
669	18.24514505	36.62708903	62.73595634	30.59727446	56.89329611	56.62811151	29.28116145	26.79997982	25.66012598	69.00472553	97.90128473
670	14.38311661	42.54499659	58.18060426	37.08240407	69.45822597	66.28437828	23.60560785	23.5223874	27.35491197	78.98805408	108.6194212
671	20.66161915	41.6322681	63.97324462	39.41871594	65.33568281	70.72764557	33.55268027	26.42187298	27.57670737	91.27336596	113.6966088
672	22.38342239	37.31706323	65.6094203	33.67065598	59.11690226	61.08297052	30.66474187	25.45097884	26.39505382	85.12624429	104.1852844
673	24.56071494	42.23367425	65.48511422	38.72261805	66.62299491	69.95757751	27.679928	25.99302585	28.08331029	88.859791	111.6631205
674	22.55244265	38.86514548	68.48050626	35.1154588	58.51944769	58.91216426	30.61325531	26.94721386	30.72906332	80.95866223	101.2260834
675	14.10770485	37.2366517	51.27170738	36.33578593	69.90274079	65.62275585	22.27716017	23.55520239	26.415413	76.37413077	107.934778
676	16.97115615	40.40188044	59.89853853	36.87527702	64.12759072	62.609198	25.60561509	25.88317521	26.15939951	77.80434126	108.612682
677	14.14402396	38.2341487	57.1845163	32.49033461	66.20248223	62.55471144	26.09780805	24.89419019	25.27095239	72.95951303	104.123836
678	18.93832388	43.73072347	63.13338025	41.78074314	69.65819267	69.64579868	24.52462339	26.91412636	28.71716525	80.46979395	116.4138106
679	13.6708242	39.1970902	56.78526716	40.12720786	62.94403107	63.24256826	18.97116263	23.63294546	29.23380899	74.07082823	100.8845471
680	11.02533337	35.87359479	54.40458636	26.88768155	46.12821682	51.03238371	20.81398679	21.37341946	22.35252466	58.34447666	77.69195868
681	21.99971553	39.85668608	73.06912887	37.34632306	66.95428498	62.25058073	36.39388394	31.27694509	29.83651884	86.25277402	119.2949995
682	23.78775286	37.62988926	69.39314576	36.53610698	74.50686609	67.72457441	32.26539265	25.09387603	31.95498377	78.95902111	114.3130531
683	18.7755712	41.17420743	54.55364302	36.22756421	62.43775253	61.60883746	19.29939765	20.03437681	23.73715658	66.17595543	99.48763026
684	13.783903	42.88543694	57.97615588	39.97171215	75.95753717	70.7445794	24.94269478	25.8790461	29.89275634	79.41421105	119.2069313
685	11.50238256	40.51551604	57.56153687	32.89576232	67.90862188	65.72331751	21.8258478	22.36426465	23.23300689	69.40700521	103.88605
686	13.92686702	41.82220075	55.8125835	35.78394458	59.85477847	65.72412378	22.42515134	22.02101524	26.74699638	70.80843111	94.69413009
687	15.62680169	41.80959466	56.16369052	36.1396582	60.87560581	66.78034743	20.25044149	22.91660098	25.30575809	63.72378363	100.0781649
688	11.60950678	38.96099502	58.40596931	40.97208503	61.11593651	60.23490335	20.65115194	22.56881925	27.63234585	76.86556269	102.6375418
689	13.78151181	38.57733419	54.31263923	35.71891703	62.35082061	64.45832934	21.47367282	21.90074457	26.20818879	78.44314903	99.90858278
690	16.76983166	43.7476103	64.21364223	39.54310563	62.12564208	62.17017326	26.05799616	24.95804065	25.27370199	75.65666027	109.2218627
691	16.72988395	43.24163265	59.70800516	41.07568983	71.29359483	65.99615463	22.62030661	26.50958735	28.1250316	75.29227972	116.326979
692	17.87231519	42.13346542	59.40709407	42.55945954	77.03171607	68.23907687	21.675025	23.38997835	28.11953439	79.12281253	118.6436491
693	12.27814221	41.615716	54.95867226	36.51071256	66.83505849	61.64092927	22.07785964	22.2955938	23.55548016	72.64613569	107.1034391
694	19.21114872	43.26183339	61.8209678	41.86265854	73.23267216	63.66556472	30.74299772	29.31381352	29.6235307	80.40747921	122.4669477
695	18.24264	40.88306264	59.61908188	43.84209521	70.26987943	67.04844769	25.20447322	24.30755171	25.61621592	82.70075038	118.7673395
696	13.80743867	41.70005792	58.04405783	39.7822466	62.25797052	63.37111759	23.4989145	21.84506042	28.61878254	73.54320758	99.98468489
697	15.98072215	39.8407625	52.2599693	39.66831244	61.67799083	57.01077901	25.60367819	23.72650984	26.84782561	76.11348463	107.1759627
698	17.20715017	39.53875369	58.3496524	34.73804603	68.39359572	72.53234506	22.79327772	22.78119727	28.17948533	72.54341323	102.7792124
699	20.36782307	39.82143185	60.43992251	37.91183494	59.69874239	58.34360703	21.46405195	22.27268096	27.61449694	66.64303857	96.10050664
700	14.00690704	40.03400139	58.74533264	36.20438103	61.35922032	54.30831189	26.03687384	24.59123153	26.04285885	70.47691562	103.4437246
701	16.36488147	42.66596941	57.9009015	42.11829646	68.5676497	65.1863788	22.32316299	24.61497138	30.73043485	85.76453028	109.4352139
702	14.62131955	42.68396311	58.1543277	40.96263332	69.34436413	65.02455049	23.20043149	26.30336261	31.26812963	85.36074052	111.4769469
703	15.63027359	42.58551782	57.85155876	36.92682075	71.70624458	69.03716461	21.61513928	23.9706356	25.9171624	75.25156514	112.1388563
704	15.97315769	42.55301818	62.87736562	38.04737855	66.6759728	64.30573001	23.91622566	27.2836191	24.68245892	78.26656341	114.192213

	K	L	M	N	O	P	Q	R	S	T	U
752	14.78978908	39.22802828	56.75603954	33.05071183	59.81118818	63.81109892	22.33311698	23.70429276	26.49513112	70.43556295	94.10807889
753	3.570781804	3.054386513	6.305885247	4.910756305	10.68536058	6.88479572	5.014262246	3.683794883	4.07937116	11.4183871	16.12266969
754	8.280224145	29.03194686	40.19562475	17.30018802	27.6119302	43.88528204	8.468577026	13.26416371	14.78399667	29.45323759	47.07457557
755	27.82420172	56.89307512	78.68747971	48.50252523	91.37923558	87.6598743	38.9393079	39.95251929	41.13690552	99.82750849	141.7115802

University of Cape Town

	V	W	X	Y	Z	AA	AB	AC	AD	AE
1										
2	IPM-ZYM	IPM-M3	PMM-FMT	FMT-MTI	NAS-FMO	MTI-FMO	MTI-ZYO	FMO-MTI	FMO-ZYO	ZYO-ZYM
3	87.23808901	77.97560065	60.85994348	16.06043145	38.63925622	29.25098599	28.02018376	12.02073122	28.17859603	42.25237787
4	99.91836201	86.17247419	61.04419351	17.54886695	35.02434634	24.7442893	24.01173649	16.35398148	24.47209353	44.09532374
5	77.40328164	72.44600335	43.90499295	15.82347982	34.96202761	27.43682108	27.65042072	11.165905	25.56495642	41.22252621
6	78.28263121	70.58562044	48.0152752	17.14743825	33.94673262	27.65623596	28.75706322	12.52365729	24.11145299	38.54252698
7	80.18077824	75.69496944	38.81806412	16.76361736	34.22425018	25.12411683	26.13509849	11.71413199	25.55031164	34.99948751
8	73.10243744	76.11962382	44.35333857	16.4933806	34.91670384	25.6823989	24.06309554	10.07777075	24.03912411	40.22256828
9	83.039794	71.50868532	52.05416188	18.74019436	33.88834212	25.8483243	28.42486574	11.64232013	22.84394241	39.78896772
10	80.85954362	69.24545906	50.7259508	16.05742925	32.79678157	26.4960473	26.66455811	10.97279898	24.6429527	35.228067
11	78.55869665	70.15578168	43.93153582	16.11021141	31.71584805	25.26035236	27.09462643	11.24403344	23.02693437	37.75272368
12	65.6854085	65.65975052	44.18810624	11.15842835	31.03934157	23.30415396	20.83992775	10.78067732	22.75982519	34.43950882
13	73.44696038	74.13157591	46.67979749	14.7847812	34.13190537	25.21901647	24.84648183	9.07884518	25.46271705	37.84686815
14	70.77185129	66.66430356	36.74503005	14.24369038	31.91089622	26.56275088	23.31324048	10.36187815	21.49115555	34.96019237
15	62.72454897	63.77014919	46.12568986	8.286850484	26.82652854	24.91323713	20.53351365	17.14479823	17.74286948	41.37834041
16	67.43545276	70.11639847	41.97827694	10.93423378	24.26186519	24.37857311	19.20251853	16.82129722	18.77962476	39.14754676
17	67.98254516	70.23511402	39.31546629	7.819233801	24.49958701	22.74430879	21.99615793	15.37822551	19.70804523	33.37964029
18	87.76794921	82.64469491	47.46238905	15.56946592	21.21063063	25.55997206	25.18053562	22.06525301	18.8127977	45.01953362
19	71.64688903	68.23996951	45.11743548	16.15149304	34.33751747	25.39813515	24.92884616	10.40780676	27.35609251	39.2409442
20	78.70087142	77.40149818	47.62787493	16.84021453	34.22785372	27.50451138	25.76186288	10.10313272	25.29049896	40.77683918
21	77.51209959	73.52187291	49.73254706	16.35204375	33.47976665	27.32001343	27.80989593	11.73239241	23.57453293	39.26058822
22	85.47929463	78.85984842	56.60842703	13.22047226	29.62391743	26.02618448	27.58094891	17.78340005	24.83636871	40.83378063
23	64.52435553	65.19015289	42.09862137	15.81242801	31.97444349	24.56306423	25.11424914	11.26510817	23.38469832	38.13098879
24	73.37330622	68.32035588	40.91928218	6.873610515	23.71540771	23.06755315	19.69175671	24.30060413	14.76089085	41.63931777
25	76.41748863	76.43310313	43.26477217	8.362988792	22.61005307	22.70642366	18.51837251	20.74217399	19.94559706	40.79361707
26	78.29828956	72.51481692	50.56148546	10.40848911	22.42480369	22.32606402	20.12879925	21.84130269	16.12195853	43.87542433
27	73.31680853	69.11283892	44.4970979	11.03466465	25.81299275	23.45747279	22.65184663	20.15843232	17.25770949	43.5145645
28	74.97176846	77.35811173	41.26428319	15.62188139	34.12681517	28.05482684	27.61951389	11.06563646	27.08511199	39.77178093
29	76.48260979	69.82058457	50.20828489	15.36586617	32.64874741	25.94171924	27.80236139	11.54298458	27.50566294	38.70937408
30		67.37192552	47.01651281	13.50493716	30.6399708	23.07560453	23.73520801	10.47798423	23.47303274	
31	71.94652594	67.35403782	48.27185721							35.18510301
32	88.46806349	87.02077839	54.56139258	15.10501982	36.72724546	27.23985704	29.24151199	14.03678901	28.29177668	43.32864029
33	73.97343557	71.6428295	41.73843601	15.28767185	16.94223221	23.86195913	20.12659208		13.3123258	45.35058392
34	64.66074109	66.57126267	41.90757554	15.45451807	17.41232682	25.43584669	20.81039125		16.42854587	45.32692618
35	72.15426121	61.71120472	45.80874883	12.65816975	29.97360238	23.32987741	23.55486366	14.70951078	20.26618323	32.9550324
36	71.01876104	65.92595729	42.69432581	13.11864031	30.31936509	23.97700981	22.57716403	12.36254448	22.83834255	38.1061133
37	80.59206843	75.02659558	50.4132042	10.55610214	26.42657305	23.5679526	21.58770098	18.70815594	19.80433066	43.38628502
38	83.03949413	72.32564354	48.69074914	16.53602833	19.73021549	24.26465935	21.62689675		12.79424525	52.14476285
39	90.40448619	83.7279141	57.08005663	14.13994296	19.71218854	24.49057771	21.23155497		14.97154057	50.85086201
40	95.7622545	73.97917672	50.43618093	15.98403729	19.25253578	26.3193258	27.11014031		11.39212252	50.11014202
41	79.72049663	67.82197005	45.89588848	11.36481039	26.0783039	22.65228011	21.9875268	20.59679949	19.57688663	41.38551467
42	69.60584193	64.33385256	44.36089566	11.78129448	28.38092255	23.55798597	24.16040935	18.46691541	20.24518479	35.46922903
43	99.19171142	79.80837269	54.80642051	8.358324621	29.80571683	25.25579599	23.06200319	20.63989217	16.85377632	42.79643786
44	87.93662669	75.01561143	45.80946002	10.94768295	26.31591614	25.05172572	23.42675536	15.59545095	18.21801608	39.74731462
45	89.78707222	89.42277748	48.86655366	8.392051338	27.98836926	26.64717422	24.05216902	19.18546074	19.57308552	42.18708457
46	88.11701845	78.2676765	50.32788325	7.184062929	25.58224402	23.4953566	19.42277795	21.59837007	16.04541444	43.37435536

	V	W	X	Y	Z	AA	AB	AC	AD	AE
47	76.07081213	75.76903059	53.49922523	17.13698766	34.34964065	25.70100629	26.05095779	8.334447355	27.30353583	36.83953539
48	77.38518641	64.321705	44.85533138	16.75646641	31.21557285	22.26130207	22.82481024	11.77428533	23.50333106	38.6380609
49	78.39520822	75.13560323		11.51089356	33.28745845	25.60270924	25.60037383	13.60239152	22.25784624	36.93644082
50	83.40278589	73.5398694	55.68213644	13.6394307	35.23531519	27.29084195	28.18698075	10.98241431	25.57018784	40.84501749
51	81.26843567	78.7635706	48.32141182	13.92631244	33.26748591	26.13740429	27.04886235	12.2740829	20.33209299	36.36276069
52	79.61528466	78.52473848	42.47151445	15.32367507	35.06881988	25.91437286	23.84531459	10.78740359	28.31018443	41.11548499
53	83.48217263	79.58918825	49.14174256	10.74681102	30.90453818	26.07891948	24.6206945	15.75618084	22.54442917	43.0642855
54				12.28308388	36.31253116	28.41047214	26.85620606	15.23128241	24.92361088	55.91574496
55	100.0292285	86.00172927	68.14076642	13.96511922	35.3274558	31.1267016	27.87099724	16.68516548	24.09081289	51.97162462
56	92.91875054	87.19441006	56.04679974	15.83238706	34.62718522	28.66066497	26.38860751	17.00404884	24.38972334	47.89810367
57	68.98829131	65.95209397	41.99476346	16.9775716	32.90918449	24.94324335	27.23609861	11.40061771	25.16064487	36.32517171
58	69.63780634	64.23686468	45.37361943	14.56105939	34.18929716	24.75483627	25.97514737	14.35817015	23.87540793	39.46627116
59	68.41049487	64.2032314	49.27589302	10.71958862	30.14841682	25.15747566	23.50541364	14.61284137	22.7755322	40.21629769
60	71.99441108	64.10724296	47.85168783	13.71174588	31.02900974	25.24365999	22.65860088	12.82347558	22.84817089	40.58471725
61	69.48244987	67.16701697	45.27549692	14.77398652	18.88377778	24.80637232	20.37765622		16.66734709	46.48739937
62	67.60106727	63.34805531	37.85460424	11.53977228	30.99202966	26.23592061	24.01043513	15.56610601	19.94517475	39.71475385
63	64.40958882	64.38225516	48.21329484	12.51511488	30.89572919	25.25431562	26.0411296	11.3623925	21.80859701	34.36299841
64	68.99174366	69.67483094	43.48304213	6.921817817	23.20776359	21.90567161	18.36690379	20.40971344	17.6506498	42.98095338
65	79.25728175	71.46316526	56.76305017	8.468440066	20.71032499	21.18721845	17.42930664	21.5359505	18.94130605	44.72005351
66	73.97385189	69.91208839	44.95093358	12.28785297	26.9505895	23.46649802	22.54561969	14.07679141	20.66582843	38.79688423
67	77.47591834	67.19581239	43.44122514	17.06033945	32.96313453	26.66962006	24.99377592	11.91940075	24.59513379	35.22367493
68	65.89039041	67.15781692	39.55203604	14.64451451	28.21542558	21.90084971	23.28188465	12.45056382	22.85805616	35.1342857
69	88.54662898	79.89559871	43.94328882	13.49986713	21.93245486	22.81167519	20.89822169	20.85033064	20.39216771	43.77912008
70	87.77803906	76.50672879	43.29858051	12.41661615	21.51564473	23.62601943	19.11219539	20.21255956	19.93174697	45.33387657
71	74.23081659	65.87763279	46.69519423	14.30141804	20.70013215	23.01967276	22.5611694	20.79056771	16.35883938	38.15154582
72										
73	77.92145694	72.45804741	47.35692692	13.46294195	29.192706	25.1020292	23.97563981	14.86239252	21.56017189	40.87342454
74	9.056373907	6.72875538	5.905204982	3.008266852	5.553684927	1.927246594	2.972617656	4.123070998	4.006260973	4.708725454
75	62.72454897	61.71120472	36.74503005	6.873610515	16.94223221	21.18721845	17.42930664	8.334447355	11.39212252	32.9550324
76	100.0292285	89.42277748	68.14076642	18.74019436	38.63925622	31.1267016	29.24151199	24.30060413	28.31018443	55.91574496
77										
78	45.29630565	51.71961442	21.90301402	8.966391277	18.55936656	20.92535498	19.50768053	13.96075973	16.07759427	33.53944277
79	88.24045048	78.00316044	54.12974207	16.80025051	34.69229099	26.57693198	25.54516834	15.97834545	24.32457569	40.55805398
80	81.77220781	73.71673996	53.5260183	15.61252862	33.9568176	29.04615499	28.28776313	9.482971557	22.04505478	42.03238286
81	62.00919381	69.89261052	38.80785391	12.14386014	27.54868573	21.80032348	24.98482652	12.99900335	20.66100407	35.2920058
82	70.89818809	73.98310394	51.8027303	13.97702104	31.55978457	26.71839109	24.82830331	13.50019362	26.560544	44.80122373
83	82.79597412	81.9491321	47.18630772	17.52665645	34.8705558	27.41075292	28.22679326	9.697161239	24.29005037	40.79280052
84	73.24076493	69.42916496	48.31911752	15.43227332	29.74564832	23.66530999	22.36074492	12.58077954	23.8006576	41.25926827
85	77.22667096	72.81271998	46.2831404	14.36593017	31.29799121	23.56959259	23.05655476	13.89923761	21.70443124	39.26329531
86	80.535194	74.29628119	48.51900521	10.45587812	26.09400422	24.5158976	22.38780787	18.78351143	19.08042483	44.96226295
87	74.18299522	72.27083567	46.78253057	13.49965002	25.52643157	22.40956855	23.54167236	17.11901909	19.82169012	45.15456392
88	82.83268007	73.49864354	48.84421739	13.52777066	28.31620127	23.71885636	26.24229794	20.42720811	21.01386047	47.10898835
89	72.54719944	69.05411221	40.19535866	11.81913816	24.14412679	23.11327673	26.32014621	15.13292138	18.26917324	37.87239541
90	83.33347335	73.69336235	54.67515845	11.82644396	30.68373106	27.09228084	25.70188486	18.32787431	21.96915438	47.47630242
91	85.31464491	80.5905056	51.06531551	10.77841057	27.29219058	27.27806633	29.52877507	18.44167388	18.97953218	41.77861652
92	82.55074419	76.94126972	53.87045101	12.17771158	29.47646299	27.12398178	25.61613541	16.98647731	23.55669618	40.39936177
93	88.97030829	82.32863068	53.44905516	15.78481569	35.76562502	30.68850003	28.25795337	16.9767683	24.40234456	50.94222297

	V	W	X	Y	Z	AA	AB	AC	AD	AE
94	64.00408299	65.99522161	35.75218048	10.53169315	26.73102366	25.56716747	26.60149323	14.26063845	20.46537821	38.66355528
95	58.24527244	58.31272254	36.92252054	15.86167591	25.88671269	21.46062932	24.90058111	10.12401897	19.09476826	33.32144284
96	78.18191152	66.72927442	54.33812414	16.95983966	31.41081085	26.22616085	27.08027111	13.57660853	27.27850371	42.43662356
97	88.5591732	80.82628515	57.84309815	11.25051059	29.40161424	27.50363787	25.79814412	17.53308962	26.05488894	45.51313322
98	77.26582791	74.471603	52.51031084	14.47884736	30.1551794	24.48494329	23.89122134	12.22678525	21.11493729	41.68156588
99	85.17026214	76.80530293	51.04477974	10.50817282	30.38053628	23.806796	21.19868055	13.94887721	24.7743198	41.26738535
100			48.70220659	13.45500721	30.3407993	23.36671466	20.88203045	15.48649393	18.37680503	42.44802337
101	82.57986967	73.99938367	52.22613915	15.52533636	32.80063664	26.44217503	25.86126257	16.36571293	23.0229973	38.46553178
102	80.90149153	70.24316269	55.74211813	16.15526155	31.97990507	24.60061442	24.56913322	14.72102389	23.65116634	41.37134505
103	77.28732567	69.72252013	46.57249345	15.76413045	32.33215749	27.74147607	25.13372168	14.19573188	25.59645218	43.91885468
104	79.7307208	71.16633389	58.17140565	13.93574054	29.93580883	23.14484479	24.67526222	10.36179374	20.66754459	41.84758203
105	69.72612592	63.366888	34.21454147	5.672921739	22.65892389	23.0752893	19.19167066	18.86450313	13.70530761	39.4064968
106	61.60132276	69.37759324	34.27026676	11.76483096	16.78331425	24.80101867	21.26233393		9.883685433	46.92223818
107	72.29996056	70.38036345	50.69961696	11.26288288	32.34049594	24.53191568	23.71790273	13.09236227	22.14499263	31.71224153
108	81.78359688	73.31564208	44.51135827	8.031970643	19.9006073	21.9087469	19.92753464		11.90112125	45.66179304
109	69.0114391	69.58972054	41.81550699	13.37254669	31.1943925	24.43293273	20.66838098	14.35940918	22.15686687	34.94562403
110	63.64913945	70.267133	38.00875339	12.95904086	28.60279075	24.1890876	21.97821589	14.22286376	22.13179698	36.72911167
111	72.8682234	70.28794494	44.40734096	15.33427781	29.45013823	22.76655788	21.71778159	13.14748596	19.53981821	35.19487089
112	79.64787859	75.37223694	45.65445089	13.59306212	30.87615039	25.72005492	23.47651126	13.9738089	19.57797368	37.6574793
113	81.10635716	76.16647344	39.83337033	11.90529917	28.65062473	24.30445785	21.10360545	13.01402869	18.84625073	39.83635943
114	84.90069751	78.03398509	45.43119522	9.649350897	27.43493074	27.23073889	19.39523606	18.10408098	20.09739981	39.75544798
115	93.53840712	82.90437208	45.74876617	8.863941465	22.3623357	22.40579852	20.85553615	22.34176617	16.15098725	45.23350031
116	67.48832884	59.54138354	37.0545342	5.106747616	18.88387811	19.70782831	17.20880667	15.54602837	18.90281126	39.5778147
117	78.14979742	68.15972509	52.02891785	15.49101051	30.66731954	24.58516656	23.03152715	14.04382976	25.11213901	39.66400943
118	82.76375571	79.45558885	44.76577563	14.24772682	32.21253731	25.99912669	22.78503032	14.59003683	22.36808114	37.77990586
119	81.54351939	74.49315928	51.29701407	10.7977185	31.58333508	26.51326887	22.11552745	15.10006558	23.62503443	41.03759593
120	74.36595699	66.71423497	40.73153763	17.48140248	33.39479666	25.36168653	25.48676387	10.70059674	25.225721	38.7897316
121		73.65033572	47.98905539	14.88262626	30.55727816	24.86237969	24.12968815	12.52014722	23.84224552	
122		72.85123011	58.93862771	18.54563322	34.98573138	25.53929902	25.51163819	14.44052684	26.29218959	
123	77.60947916	73.84018354	56.10235346	15.77464389	31.07095054	25.38047622	29.565074	14.9262962	17.37055261	36.37739212
124	89.13313463	79.80588157	64.37956443	16.01418895	35.752085	28.52729017	25.80808967	16.49866896	27.31173011	45.79133048
125	87.41027649	81.28997576	56.32275887	17.04958214	33.7517004	26.31667144	26.47321042	14.80442021	21.23537982	43.40651511
126	82.49046585	75.14344535	45.64502693	15.18238912	31.34584224	23.83184929	21.55260418	15.76993815	25.34659078	45.05467426
127	80.73347524	80.2121994	37.56454944	10.33790959	29.04737575	26.1402496	24.15073564	10.3445591	23.00680045	34.46482547
128	77.3678103	77.55439759	48.23128909	16.97733667	33.87230498	25.52788986	26.827556	12.6505052	25.96338336	42.97811737
129	81.27678071	76.20742405	48.20650973	13.50750345	29.22233591	24.5383672	24.09246925	18.10826983	21.73659667	46.9624957
130	79.67144764	68.24215013	50.23692816	9.402929531	23.46970892	24.6146582	19.85617712	23.34523276	19.90071123	47.36817583
131	70.48800764	67.61669978	45.93690895	12.84096817	28.68907584	25.37855957	23.01500823	16.82558806	20.50106376	39.1368758
132	81.01202764	66.58981351	47.38416481	11.6525713	27.3221792	23.36863808	23.7068152	17.57375824	18.33775489	37.01313401
133	67.75953118	71.64937298	40.68134376	14.44908931	28.37339671	23.48864794	23.0061051	11.67940255	21.88444574	39.63806758
134	84.65749306	72.36026819	45.80105224	12.43519618	17.52036763	21.58131667	22.05026661		15.15675008	41.84592893
135	85.28490923	72.57959233	54.75452956	15.08324548	30.82430724	24.39848046	21.92836116	12.92725622	21.69253587	46.18731614
136	51.89228492	55.60069459	24.01095672	12.82133096	29.49488353	25.33327615	21.78056144	10.20928389	20.1193384	30.71493877
137	51.90940472	55.74237449	24.67558287	12.04572731	24.02220647	20.88242949	20.4618373	11.64866988	19.4242017	31.92871796
138	84.78471142	68.75437269	42.56242051	6.809324621	24.10871683	22.77279599	21.26400319	19.96089217	13.71477632	39.14643786
139	57.15716994	60.42503907	31.25646206	9.080083326	17.59475918	19.1275965	18.97833891	16.72244947	15.34094633	35.08042838
140	57.34519449	54.82490632	31.05713607	13.14841309	26.24941682	23.09407302	21.11731895	9.528802635	19.14575076	32.06757259

	V	W	X	Y	Z	AA	AB	AC	AD	AE
141	80.53791659	75.4717788	50.09757772	15.79486273	31.60352981	23.32301448	23.10862649	12.93231936	22.90857657	41.69441593
142	85.24885255	71.60827468	61.38273599	13.17099671	32.74328096	23.93440995	25.93377274	15.58753819	23.01628427	40.03990502
143	82.07736164	78.69987871	45.40968965	14.12805976	30.77481224	25.2566586	24.99588134	13.6419597	23.59307648	40.23648843
144	85.75688364	79.48074913	56.51865364	12.62804591	33.55559193	29.18897403	25.21801879	12.70981684	26.32319164	41.88910909
145	78.0789439	71.73657566	48.1001927	14.83705231	30.00039239	25.53626086	23.44344264	14.26259185	21.43897116	36.80363496
146	74.14080243	66.81975226	48.21917586	14.03240955	29.67544801	24.75643282	27.50246539	12.52590886	20.24927402	39.13227718
147	86.42388314	81.20316619	53.95859125	17.84388647	35.91751276	27.3620292	28.659801	14.22827917	25.3571554	41.34418054
148	81.73004964	70.82686002	52.73897163	16.06506977	33.93842686	28.2146359	24.76133228	12.52641532	24.92757949	42.6290644
149	82.79064788	76.19829546	63.1678638	15.33914394	33.81014808	26.54648672	26.94839721	12.40867254	24.45644093	40.98609808
150		78.94847679	42.74412426	11.06572497	29.66968036	27.63497062	25.19297745	18.15480114	24.70725389	
151	88.84505794	77.78302639	49.7980245	18.09732808	33.63640321	28.62997701	28.02457467	15.97904821	24.15360209	44.04825311
152	88.3586225	79.74015454	55.47529601	16.96929994	32.02348178	24.77145732	25.20641687	11.83657168	22.78043953	39.6596618
153	76.97929125	71.288458	54.99738287	16.68180782	30.47868547	24.14293407	25.12978756	11.45157636	23.75553006	41.50213069
154	85.26672677	76.59333294	48.37955006	17.67224422	35.78983343	27.53606622	26.69963932	13.39873046	29.16412783	40.95987825
155	78.83779947	76.03507775	53.72335993	13.47868575	30.92833268	26.32260018	24.37698833	15.84283646	24.00423257	40.70644519
156	79.70317508	78.76018434	44.35944631	15.62937338	29.45097345	26.45897447	25.48675168	14.76530901	21.25306357	40.70176908
157	81.15999029	76.42374422	44.47765098	14.61475042	30.25565676	26.27512283	25.83101151	11.6824877	21.94472362	44.18383485
158	74.77878423	75.10295044	51.54287962	13.97975535	34.91434802	28.45003178	25.76957084	12.2203716	24.82420681	45.61271723
159	80.90763779	72.07749544	45.64193351	12.73262581	31.21731469	25.09840079	24.90345752	13.52399203	26.32421091	42.68195055
160			60.01077966	14.79434234	29.82172587	27.97935283	25.10723962	14.38261367	25.497225	47.1323302
161	88.5573274	85.5687093	52.33022948	11.85972392	27.30827469	25.57668523	23.47882307	15.78293758	21.84717115	45.3138136
162	83.48903289	78.8119317	53.65908357	13.33100792	27.54550898	24.31889863	27.575105	18.45718896	25.82631871	47.86942056
163	80.77516902	72.06076115	54.66572377	17.0278429	32.50961566	26.27282461	24.41304891	12.47401305	23.33373948	43.08690488
164	90.27743613	82.20646407	58.8298904	18.98202064	34.0774142	26.86677977		12.91948354	27.81412345	43.35406989
165	89.95173818	81.82751304	55.50477501	11.33343631	30.47512466	28.32560605	24.87291204	19.20897398	20.58786504	46.35291544
166	84.57306123	79.66692823	51.89118911	15.585085	35.30196583	29.19813189	28.64894575	13.08788773	23.47445643	44.12611573
167	83.63134558	78.60488969	46.32755748	16.01260574	32.28789512	25.11916251	25.55130122	12.70167677	23.15755612	38.95418897
168	78.04116765	76.49061216	50.48079609	14.13261921	32.58225858	27.25747425	25.42086049	11.40588204	25.73222287	43.57804562
169	76.84937447	72.14950192	51.26018618	15.50862904	28.90168581	25.68583075	26.50096319	14.92485462	21.11611078	37.45906685
170	88.27679469	75.48926699	45.14302716	15.00078413	34.12317283	27.72331136	25.23241212	10.68156615	24.18688076	40.21293612
171	85.44472672	78.67871013	48.77720632	16.96846916	32.51669073	27.08101566	29.57937493	13.15557521	25.5433483	44.50758077
172	76.75946723	76.5758734	49.92403863	16.0906252	30.9332886	25.44235699	23.85764709	12.44831208	24.22096135	43.0625369
173	68.74439357	67.37879967	44.6581061	13.31812427	28.5089276	25.66429136	23.03241722	14.40032788	19.13887276	44.94833973
174	80.84334718	70.53004245	57.85720645	14.24510577	31.82341913	26.65551128	25.76912862	14.5811706	22.21216043	39.87902648
175	78.53920821	70.05098126	37.32513956	17.41244171	28.59508546	21.83868315	22.61414233	15.37154697	21.54295498	37.06829921
176	68.01634278	68.67270305	41.28863613	12.910441	29.30223939	25.26156573	23.74927735	15.91716204	20.84987078	40.0977404
177	71.3277208	70.83370877	42.34097883	13.41099259	29.23373417	24.37050073	25.10428669	13.36402958	20.22464874	40.79275612
178	78.96776262	71.04577946	58.05849067	9.029308973	29.91472359	25.20136551	23.07347082	18.18571748	21.05906716	39.54232517
179	80.92502356	63.25549713	58.26505362	13.86706601	26.10029554	22.85957256	23.38364691	13.68156597	16.71166429	45.19315802
180	75.2595825	69.12177508	55.6829412	9.581553334	29.58681853	25.90981917	21.91874298	17.21083312	22.79481667	38.09532011
181	72.27186093	64.90484166	34.28476022	8.467533928	26.21838394	24.16494126	19.7858226	16.99675408	19.60640664	36.73737256
182	79.02098505	67.28303378	54.91378891	11.916642	30.09652761	26.39309194	24.40341134	15.56512733	18.68627592	38.84256716
183	79.30072669	70.825374	58.02422166	10.60376361	30.59344274	27.49366277	21.73436304	17.13566082	21.24691353	40.70003681
184	78.1349665	67.89564215	55.24727474	13.05462296	22.10364402	24.69388785				
185	79.37379169	78.05614133	47.98544616	15.54554117	32.08561471	24.03676569	23.49130134	11.5616668	19.95633915	36.52553593
186	76.88981208	72.58045614	39.7274732	10.58841373	26.93548091	23.54130369	20.21901322	13.51915733	19.45411246	38.84873694
187	72.32659269	63.44868331	28.70999476	11.63452016	25.86498848	25.26803478	20.69481185	17.99963798	17.7717076	39.16940218

	V	W	X	Y	Z	AA	AB	AC	AD	AE
188	79.68098258	73.57526184	38.25492729	14.50109304	32.18786563	29.23235711	27.31036354	14.82395233	20.6037527	40.006956
189	72.79179314	73.15194807	46.67756263	15.37991319	29.83422133	25.25434877	23.14941437	13.53298626	21.37692991	38.70923149
190	58.76241981	61.70330144	30.80976455	6.828750805	21.7563192	22.47924213	16.90748387	19.71451947	18.54149504	39.55621338
191	75.86747708	67.019489	35.60079059	8.302487949	21.9497661	22.91321582	22.46246741	21.30173033	15.82804037	38.47732626
192	87.46238462	73.3229382	36.12659598	10.6924799	18.15276913	24.31197478	25.12305916		14.96862874	42.00585285
193	85.6171355	73.75015017	40.4443335	10.52660697	18.52535488	20.4992549	19.5279471	23.50290655	16.06525372	46.20616137
194	80.38242868	73.72132376	53.68500055	11.83660575	16.96449254	23.92167395	23.05597366	27.56609872	17.33638245	43.23506797
195	72.44064517	65.40949292	46.09846257	16.18336836	28.72130825	21.2519381	22.63432146	13.75263563	21.66612808	37.16608913
196	79.8315473	67.06709723	42.33894747	15.26583348	29.53449703	22.75823503	22.84594069	15.02396913	20.72622524	38.64801722
197	83.78130385	77.69070291	47.48071883	16.36277913	34.69484438	27.77999705	25.56435298	14.42620506	24.38304028	41.79088321
198										
199	77.92095954	72.45799201	47.356823	13.46292228	29.19341276	25.10232603	23.97602746	14.8619632	21.559831	40.87327199
200	8.771932615	6.332099675	8.37543072	2.856019143	4.4725548	2.183403196	2.615771067	3.094030509	3.453557268	3.853396563
201	45.29630565	51.71961442	21.90301402	5.106747616	16.78331425	19.1275965	16.90748387	9.482971557	9.883685433	30.71493877
202	93.53840712	85.5687093	64.37956443	18.98202064	35.91751276	30.68850003	29.57937493	27.56609872	29.16412783	50.94222297
203										
204	66.48325558	62.38033761	36.08383773	18.1890949	29.29233708	21.99658706	24.07661209	11.30719497	22.64452616	34.79389025
205	69.54526975	63.0745545	42.76011651	12.08341375	26.61480746	26.03959884	22.05059729	17.09689932	17.28159206	42.52034496
206	71.76254796	64.02764614	45.50005464	9.046769821	23.78007174	23.27670559	18.85440327	21.28364047	15.70028851	40.10775824
207	72.90446603	75.17349575	41.20095379	10.51966851	25.6255585	24.43069141	19.4325593	17.11125626	19.26723589	42.76073878
208	72.29873595	73.8162202	32.88583387	8.38428253	24.9432638	24.78854194	17.09545603	17.01852964	17.43216227	41.65779652
209	74.20681336	63.94048096	42.21902417	14.97065957	26.99441483	25.81431213	26.1125138	14.60075704	19.98979701	40.10742039
210	67.67101315	64.55776166	42.79777997	12.57793786	28.35755585	25.91792944	22.18569791	12.39731748	20.65272574	40.38861364
211	79.77032509	67.11703016	40.25982407	13.40261758	27.62756641	26.70377941	26.7391431	14.86891977	19.91238116	37.61546888
212	83.64567452	75.50333146	48.64453478	12.93093819	23.15689161	24.61290683	22.92708266	18.84958141	16.50992658	43.23587961
213	75.04724551	67.4705022	43.49439002	17.4245541	32.22698959	28.04289268	26.34162509	10.02058592	24.35692352	34.59942297
214	77.40427826	67.51855165	38.51667885	10.46251946	23.12676281	25.08829315	20.65039027	15.43751964	17.27710327	39.60343616
215	68.12311545	67.70173402	37.36638171	14.70523766	28.7361827	25.04148689	25.94203424	13.54993149	18.54463342	35.93932146
216	71.8856339	66.6567266	46.98623897	13.05714897	27.72372092	25.46901845	24.21717677	11.21574299	20.0181234	34.60034814
217	76.2472527	67.76375738	46.31102531	16.5707622	30.20653139	26.54012141	23.99745315	10.07472235	20.73860932	42.21389054
218	68.83073827	63.98445465	42.47146982	13.9646005	29.00530839	23.74306285	21.24334557	11.51987104	23.34809839	36.86180177
219	77.9854199	66.17313428	43.86981359	13.92496327	30.70062134	28.17686852	24.92006451	11.57528336	23.24446877	42.6306325
220	69.69727121	67.65939306	45.47177897	13.38422877	29.36375305	25.48831615	21.69191372	13.27649119	20.15431326	38.28115139
221	77.48343822	68.6755127	41.7861405	10.03548512	22.59630493	23.96369999	19.79723701	16.15737497	18.40217004	40.86276552
222	75.42142994	68.60427425	43.58982	13.538324	29.30810492	24.90341633	22.80066071	10.50135342	22.3628177	37.23265191
223	85.77506178	75.72667337	39.81487828	9.822293073	24.898665	25.00564187	20.35992783	19.13016154	17.97228885	44.8811214
224	71.98600343	69.88762098	40.03561175	6.916410081	22.57129213	23.63623944	20.66468943	16.68157141	17.61413118	42.96220662
225	82.66915805	69.36422008	46.28894329	18.60423688	31.7422317	24.87136968	26.40525618	11.18011312	23.69317301	38.08862672
226	66.82035388	64.47794349	39.52681577	11.33122994	29.08703037	25.49197963	19.47206272	12.56520191	19.58087824	38.58582555
227	74.49542201	65.6470385	38.45789056	16.14287265	30.45179251	24.1499177	23.62204584	12.49709812	23.80490667	34.64008751
228	85.54627697	75.48098742	48.81465584	14.00531807	17.05205263	24.01839567	20.0141224		11.8272258	51.68780051
229	67.54285555	66.88497439	42.34251408	16.07032844	31.10103756	26.26702055	22.31091404	10.56244693	21.54581108	38.20781417
230	64.237771	69.21322157	40.24076667	16.44342711	30.07399168	25.55822862	23.74194729	11.36304218	22.92652861	34.49952042
231	81.63357048	71.8426676	52.36084061	16.53262481	31.31300729	26.70557312	26.50230776	12.72404704	19.66493149	38.75979139
232	72.39331451	70.42214242	40.85479133	15.48782931	29.78545108	24.8933711	23.09651718	10.94870623	24.56437899	35.74902932
233	75.07565489	70.7305481	44.08437086	14.66860167	30.10517056	28.65639858	26.02401033	12.21218551	23.81056159	39.92062637
234	73.92193281	67.89176425	43.32690702	18.17467825	32.26153482	24.1427687	26.90989553	11.70109336	25.31539527	37.37481473

	V	W	X	Y	Z	AA	AB	AC	AD	AE
235	80.05408106	69.22548176	42.57279327	15.60326019	33.70797228	26.30855824	24.1676156	11.6885679	24.30068804	36.68460112
236	78.84276441	74.31824308	44.4554752	15.28043727	31.35802162	25.61837536	23.28095486	11.96999831	22.35312903	40.51758466
237	82.14885411	70.68050689	46.95520118	15.37024332	17.44628972	23.48255929	22.26522106	25.95523085	11.76786889	51.13738766
238	79.94623899	78.8987896	41.53717072	16.53577737	12.93938326	23.23347876	18.99331198		13.30327973	54.74880346
239	72.32377431	67.18378823	41.2865748	10.51604718	22.58120677	24.23243544	22.11915101	16.07665883	18.27357634	41.39237859
240	73.87391763	70.75507838	43.42690017	8.485402733	24.86666696	26.31193023	18.26129752	14.30668675	19.74347511	44.89712775
241	92.10128236	81.58922006	65.04132021	14.88510683	33.25401989	27.46892078	21.84463131	13.85726447	22.80826937	42.50144865
242	67.58483049	66.48834937	47.31222693	15.70443563	27.64431367	23.19160676	23.33953432	11.09856391	20.50896368	36.84334812
243	77.80696069	68.27573351	45.92986957	8.365729302	24.3050257	25.42937818	18.36868683	16.44102316	15.93260721	45.59553923
244	72.4891048	69.19346506	46.44144332	13.1056766	28.50417655	26.13035315	24.91553719	11.37381415	21.77099818	37.22035272
245	77.67882001	68.63545609	47.77435896	8.916414769	23.08479283	25.24933327	20.53539351	14.89833017	17.0027048	41.98466684
246	68.84982177	64.32774957	38.39364158	14.70303644	33.48140833	27.26179699	23.62929023	15.15688461	23.72848681	35.38085629
247	70.78501493	69.76160091	43.51816604	15.83169313	33.91021473	25.8815014	24.89334663	13.71069278	22.17535662	35.61468895
248	72.59808111	66.80250047	38.29880935	16.20055891	30.4329738	22.08663559	23.30375128	12.50969707	22.4767103	35.57026568
249	73.60747236	63.41555089	47.8904087	11.59648873	24.88274606	23.05426071	17.80996429	17.01507586	18.4243993	42.27638395
250	97.96012449	82.03441075	63.04963579	9.099685551	28.21618054	25.52059005	19.0341941	16.85620907	22.54702121	49.16989761
251	68.3669941	61.6265743	35.19992168	10.61200261	25.44790717	25.79478838	18.12996635	14.84339461	21.97435911	46.27014023
252	69.86311411	63.02578804	42.31835388	16.01188026	29.13384069	23.85390303	21.3966206	10.51913787	20.82661711	36.92150142
253	65.77413958	63.4002968	39.49659838	11.14611405	25.22783205	23.52469019	18.52083047	16.52526638	19.22804888	39.02704579
254	71.95814614	63.37268167	40.64121928	8.720516837	25.29454463	23.45391052	21.50749507	18.6167409	18.81059431	40.60588458
255	68.93573163	62.03930613	42.62973455	7.88498512	26.72525925	23.58639831	19.23459582	16.29013355	18.74560735	39.20383556
256	66.31822929	67.59480193	41.79121054	15.66292078	29.66823684	26.04509328	23.38297951	9.997360086	22.4396384	36.81645572
257	74.05349978	68.21832187	31.0562223	11.37464631	24.50313919	22.40503799	21.30444553	18.00571856	18.310607	43.49372866
258	65.62802107	65.66792235	39.49288257	8.874414919	23.31208576	24.82435671	19.65763919	18.75373825	18.23723041	39.43534311
259	87.24121005	75.41402267	40.42981572	16.65413277	18.49613393	24.10406458	22.41053319	20.4185489	13.33546257	45.98443656
260	79.90798645	70.29192145	51.19895652	14.79089033	18.89742624	24.2703072	23.69134095	25.35514871	19.73335067	43.47854315
261	90.35681488	78.63317626	56.65480201	11.2483626	29.46122874	26.17781839	23.83347039	15.6665265	20.27349925	47.44004299
262	84.14596651	71.56674751	53.80167826	14.56653388	17.18823494	24.93480075	22.93868147	25.80005105	15.44957525	45.56335042
263	59.45268827	58.10312252	27.58379852	12.65697071	27.53246839	24.74371678	22.94189824	11.16444942	17.89639087	28.81182775
264	66.0801727	66.76880491	32.75768816	12.94975404	29.86287592	26.44427164	21.37976241	13.9026849	22.20229923	38.42801222
265	76.06266964	66.38696818	45.53595885	14.92249953	29.52455386	25.29186247	23.68315372	12.40645056	20.46445733	42.13911376
266	79.61771934	72.94231458	42.44159847	7.211256581	20.72139002	22.7558168	17.0729272	19.73521195	16.04417637	46.40684371
267	71.68236801	67.93315235	46.17579362	9.395314661	27.10237827	25.98650027	23.64056838	14.84331771	16.61727608	38.65133297
268	81.3794013	77.84662052	40.93692824	15.3354022	16.15879543	24.32795846	22.35404695	25.37164161	15.0014	40.67021282
269										
270	74.8305741	68.79672569	43.26756678	13.13217922	26.68774967	25.02187913	22.21603846	14.92950571	19.73640357	40.49620894
271	7.228478006	4.925769488	6.24673339	3.060989239	4.659521457	1.438942694	2.560211899	4.020152709	3.171595229	4.654080168
272	59.45268827	58.10312252	27.58379852	6.916410081	12.93938326	21.99658706	17.0729272	9.997360086	11.76786889	28.81182775
273	97.96012449	82.03441075	65.04132021	18.60423688	33.91021473	28.65639858	26.90989553	25.95523085	25.31539527	54.74880346
274										
275	62.63863695	62.78715983	28.64251278	14.57676593	28.50327017	25.0643096	23.6974772	10.34693782	21.65309663	33.04859034
276	73.56671041	66.3430871	54.7011936	13.62173142	30.52615071	25.3553564	25.06372811	9.156233694	22.64067811	38.69390287
277	50.00941434	48.72785811	30.01668477	10.03192984	27.87089276	24.1483969	21.31189143	7.388005022	14.21285663	27.8911682
278	75.38197321	70.23887162	58.49734482	14.42896607	31.7504776	29.0654758	22.42203185	13.85721008	22.80364238	40.23185772
279	69.55927175	64.66957352	54.31239519	12.10305792	29.07486067	25.02150857	21.05880718	11.74997013	21.51216009	42.1273556
280	68.05302866	68.8583718	49.04527062	12.89868046	26.94729025	23.9069381	22.42099803	12.68640565	21.36375369	39.94456924
281	74.38362231	76.58023164	46.51525381	13.34175867	31.31894778	25.65836923	22.80642221	12.37075791	21.19971708	38.80154133

	V	W	X	Y	Z	AA	AB	AC	AD	AE
282	63.6562064	62.01775537	34.93222823	12.05866459	27.0173008	21.82239886	20.16620586	9.838400624	22.25453058	34.89055893
283	70.0968461	63.17961625	42.40309976	9.114902824	26.19116786	23.66707639	17.74073536	15.80691741	18.87134368	38.46093608
284	73.61711493	72.37153184	43.84897283	11.53319766	25.36840878	24.9687242	20.65864289	16.57335497	22.52162126	40.92810336
285	67.97004967	64.60198634	54.04276335	14.21587421	25.80459878	22.73132573	22.1888642	21.01311609	17.45159808	45.32472737
286	75.98103332	71.71941856	42.64673663	12.14045557	26.97510344	24.61804601	20.28166864	17.00798148	21.44910955	39.83131271
287	88.80417247	67.02290202	56.76008393	9.361874687	22.48514251	20.68504492	19.95049652	20.23998451	17.918257	41.07962223
288	71.72120741	66.02021743	37.03092846	15.10435416	31.88490947	24.47632997	21.24397512	12.50337833	20.87993425	37.74820572
289	70.95701575	70.5782891	42.16317224	18.32354863	32.64127589	26.63203731	27.28696492	11.85747587	23.46996361	34.98000556
290	81.74902557	72.53355857	55.77332361	11.78157302	29.26080339	25.84660715	22.08873892	15.58739651	24.04982363	43.30846359
291	77.70226886	70.11689282	45.36477591	15.77598324	33.01795455	28.39747302	25.905401	11.98975607	20.46101455	37.33447295
292	72.03585986	67.25565648	37.73638899	20.53647217	31.70461351	28.26005399	25.73369396	11.76848172	22.6576616	37.66419418
293	69.00071643	68.22769674	37.07050235	15.61501093	30.68116837	25.67818324	24.64178645	8.982038825	20.48959026	34.94473637
294	77.67262124	69.47935654	50.19054815	14.02786894	28.96329984	23.65238323	22.67651423	11.91457317	20.66491239	34.71097687
295	89.40038388	76.39113609	44.20258194	13.3826481	17.46253127	26.16112791	19.81706274		12.5865802	46.18005785
296	77.97424563	67.58857738	43.31107832	16.73054412	31.9000431	25.84364474	20.44738483	11.82518044	21.55492807	39.60691704
297	77.17090207	70.89067408	43.48003109	16.19095711	31.37803284	27.26093926	25.11281508	13.38337066	23.07381198	43.32099541
298	81.60897549	69.4132038	43.90193218	13.98679457	29.73662462	24.22485186	21.28002714	8.789613808	22.36705658	45.96484686
299	56.02571367	52.81139575	25.68669085	15.47523242	28.2445106	23.65711713	24.73022807	9.892844508	19.58475891	30.24326734
300	78.03632633	81.00795377	30.78946706	15.24145407	33.3130443	27.08664482	23.07143725	14.66947149	23.75477485	39.61666022
301	81.917071	67.3549905	45.48907006	12.76612529	30.38990113	26.13917985	27.61618595	13.56958928	19.95483769	40.08004384
302	75.34802407	68.76537749	47.93522792	18.33276416	27.23408864	21.56932636	22.66248293	13.3704416	19.87393627	40.23271486
303	67.23593607	72.65147741	33.96630862	11.18715943	23.31547343	25.03097263	21.44562447	17.87018688	15.98440338	39.83316747
304	70.69486888	69.4713004	46.88644539	10.34945666	28.78095839	27.43005452	22.36421117	12.18235381	20.656563	43.4263437
305	75.45703958	68.32648857	44.04022778	10.98847628	28.17607746	24.75949044	22.07968956	11.92925983	19.74387979	36.85198517
306	68.98605985	73.27990778	43.83459057	7.997633658	20.3648056	22.8673996	19.48266721	14.85497634	14.9149989	41.64874794
307	75.53782166	72.69558725	49.66065175	13.88886225	31.34940252	25.64568617	21.87409156	13.1832967	23.05693113	40.64809028
308	78.47981818	65.2900678	55.79518746	12.83691571	31.60531282	27.24947589	24.30119019	12.01594472	21.95103075	39.8552617
309	80.24050239	67.85484799	45.34950771	17.10127505	34.90154229	25.80335609	21.70614026	11.09929588	27.93854153	46.77973184
310	72.4036612	71.30046557	37.24568358	11.37604269	24.34062827	25.11505906	21.05202476	18.37253401	19.5258713	37.93474322
311	77.41431804	73.67234951	47.95677244	7.070522366	23.56561559	25.2134883	17.99503108	15.63525226	19.79772473	43.57328078
312	79.46902301	68.01619618	31.45011462	14.64915606	28.36823459	24.24120492	24.23855528	12.00842685	19.67132963	36.66531122
313	73.07469641	71.84756359	59.50196209	18.90618463	31.91661086	21.26642949	22.47934108	12.76205452	23.38023954	41.2245795
314	88.57334765	72.5118417	59.84107683	16.71005495	33.04417518	27.62791917	23.01580566	8.867238155	22.4610351	44.11803339
315	77.72944751	72.64913574	37.38601132	9.114905434	25.91917422	23.98631268	20.19846068	17.93063338	17.30103946	41.31210867
316	79.7982317	75.48446351	39.96268451	9.916642772	15.31415393	23.67671906	19.66269336		10.69602235	50.97927682
317	72.60982181	64.65321697	55.7824009	12.61047042	24.74952612	24.78942174	21.86587595	20.05140142	20.79652399	47.37708674
318	80.68244384	66.03481697	41.82049424	13.07380691	33.73323306	28.36890582	23.82839324	13.39069869	21.2191071	41.41141881
319	76.13379472	63.77247992	49.57349815	12.73379375	30.8277104	29.73083345	25.44243673	11.21250893	25.30250014	39.41871292
320	81.74488535	72.40508383	49.37185603	18.21501531	30.25733626	24.54567975	24.19721788	13.21961096	20.95315973	36.19764186
321	74.00838446	64.57875564	42.86134994	12.62363489	27.5252358	21.65911724	20.7224942	12.20100897	22.61823998	40.69325397
322	64.06109994	59.21995937	27.77598008	16.16153309	15.13356901	21.28689828	20.95072285	27.11650642	9.25702367	42.37078099
323	80.04109108	71.5181195	37.97578311	12.26112405	14.46207938	22.77719856	16.44084859		13.74571521	47.04765018
324	97.94976304	79.32999073	45.19257523	10.99456279	18.32309904	26.60097233	20.65375756		16.61975227	47.56375372
325	79.00421191	72.92460711	35.17236769	12.32868193	11.10875057	22.95004909	21.15435063	25.5147584	13.08373973	43.4689681
326	88.05401195	74.40686613	44.85588095	12.80225265	15.01750982	24.05981005	14.96983934	29.56833296	13.8769212	54.50750313
327	81.97989704	74.96223818	36.0412501	14.28731038	13.42476411	24.78760343	22.35370597		14.63306748	46.14654108
328	74.54982209	69.31206687	44.07222092	9.729196426	25.42686773	26.24833563	22.52015395	15.95741279	15.50008686	41.71147755

	V	W	X	Y	Z	AA	AB	AC	AD	AE
329	79.6329162	65.95140183	47.04868759	10.52491463	20.60365852	22.3291768	19.06644022	20.63581317	19.96540485	42.23860851
330	76.63033761	71.96525878	41.83427216	11.58659456	25.47948364	25.51309056	21.40644702	14.25590064	19.88820618	40.0962024
331	73.96468948	68.23656863	47.67512158	15.45641015	29.44014892	26.0544646	25.34036168	16.1997634	22.39358292	40.04406147
332	79.54875261	67.97234315	40.12580896	10.41714753	23.08812523	23.37012438	18.95142199	20.88124208	18.24830498	40.22632253
333	90.09534482	74.24941888	49.43402937	14.61421024	32.18829819	30.26794027	26.71640022	9.66622706	26.03975299	36.8613535
334	78.65495535	75.42131637	49.32606221	10.84711431	31.41434302	28.25863645	22.86336306	14.7288217	22.63761862	42.81180296
335	74.83396591	65.29063075	24.36929128	15.60416497	29.90756562	28.1176384	24.28378481	13.5111718	22.71278323	37.81049689
336	77.33794073	70.05587376	44.0928206	11.91663262	23.36606389	26.02065365	23.25566488	19.03079941	17.46363303	45.36559965
337	79.30357823	70.7543911	44.33942278	16.33310915	31.42942654	27.92123498	27.122358	8.792892189	23.5871788	37.42909341
338	81.60149442	73.866869	33.7968811	13.22650738	17.94556668	22.21457953	19.7026977	26.77477344	14.44492313	42.41894065
339	72.80038234	71.84591311	41.94621477	12.84140438	17.41842707	22.67903643	19.08043827	25.85768589	14.27842524	46.69816803
340	74.24397964	68.17925074	58.74384307	16.81491364	31.48936377	25.05270365	25.04243863	14.48656511	23.50997393	43.69434706
341	69.82557062	62.17595276	48.30012574	10.58559476	16.63710032	23.68629605	19.76115403	24.9760952	15.68648472	43.11918152
342	72.3805874	64.98069614	40.12929129	17.46459931	31.15268424	21.5982075	24.01596552	10.20582975	23.8435797	37.33852634
343	69.82474307	61.37668725	41.86404974	9.880712485	27.98931007	24.7914202	22.44548978	18.26751218	18.6762507	35.61466993
344	58.05299848	59.84929644	41.72026046	9.044446783	23.00038955	21.84134018	22.85256342	18.63443062	14.87485954	37.33904423
345	72.51829396	65.46739666	39.79763727	17.56501408	31.45222971	26.63675643	25.66728746	12.28313846	22.54224266	37.9710053
346	70.91123706	71.57680369	40.27804657	17.761011	31.91764485	26.74464276	25.38937687	9.339089426	22.45663268	39.3812509
347	61.23526016	63.05472995	35.06607878	8.980547392	18.85277452	20.55650573	20.46860474	17.43389595	17.78513263	36.60939582
348	73.19195382	73.75085494	37.83618006	8.762157152	24.84256113	24.54195855	19.39975371	14.85565447	18.80012604	40.63874121
349	69.42929665	75.31232907	39.17340645	8.984027038	23.52629603	24.47284932	18.67707204	21.12551405	15.97385097	42.70872734
350	83.43913651	71.95038	48.40119137	10.41723558	31.47110565	28.0594365	22.21071743	14.07546784	20.80982543	42.82706155
351	60.95390134	62.70291947	38.15095971	9.442228785	26.67754558	23.01626683	22.64619625	17.80732993	16.05885006	34.07693056
352	68.44057055	64.41968879	32.3297955	12.59203116	31.80313653	28.67269968	25.42412792	10.97064435	20.73230134	35.41012223
353										
354	74.83082467	68.7965411	43.27746949	13.13175116	26.68835268	25.02224261	22.21625791	14.9298471	19.73552977	40.4959732
355	7.837327707	5.374268257	8.031764553	2.950471882	5.679373376	2.227080228	2.523885572	4.877185787	3.670539393	4.377493244
356	50.00941434	48.72785811	24.36929128	7.070522366	11.10875057	20.55650573	14.96983934	7.388005022	9.25702367	27.8911682
357	97.94976304	81.00795377	59.84107683	20.53647217	34.90154229	30.26794027	27.61618595	29.56833296	27.93854153	54.50750313
358										
359	53.9583614	55.68609322	24.02854454	9.27171288	24.57522992	22.92186282	22.46363909	10.98375749	16.3770934	32.23744234
360	47.10382222	49.00498707	23.11706431	11.47516237	27.30649926	22.76603315	20.91051402	9.754557008	17.5349301	25.34636621
361	54.40347419	58.39025723	22.25226051		23.27300116			12.5718022	19.10803841	29.46725808
362	51.6860218	50.74526558	21.89978779	10.88236559	24.78876493	23.65288919	22.79110093	11.47332931	15.77539697	29.41962448
363	55.36494401	57.12667752	31.27101343	13.94862375	31.08944361	24.91116562	23.93399238	9.565691569	23.14489534	29.40306325
364	48.81033638	49.00663355	28.52576973	13.07116724	27.36979769	22.28968234	23.74014705	11.73486648	20.84064275	24.21394543
365	50.17263124	51.2214247	21.92832269	9.920204912	24.37527299	22.41028188	18.14784839	10.52193503	16.83693043	29.57166199
366	47.92197195	46.87274829	18.15736875	12.02200785	25.98224351	19.67147097	20.13471787	8.848724002	19.97557384	26.2017048
367	59.86344261	56.16764128	22.74398007	16.49881118	31.21010088	24.41120596	23.76061702	11.03726791	20.79650477	31.0556263
368	51.72214936	54.0316823	25.32670751	16.33109428	32.3564503	21.00188048	22.55131464	9.838268876	23.25595315	32.93790925
369	47.3123103	52.95895608	17.79177253	10.51337808	25.19176484	21.8937396	18.58835789	9.464669572	16.53486284	28.46804843
370	52.54881554	49.19294046	19.12980774	11.02564463	26.15759206	23.86633928	21.37825035	12.15585688	17.37843352	30.7372915
371	49.79319934	54.88938462	21.59453119	9.735608801	21.43245734	21.28779493	19.17121492	12.66132113	13.87968204	30.42730934
372	48.54198515	48.27841435	20.60453802	12.98750604	22.33506975	22.61193339	20.45110908	13.32434538	16.52901333	34.67068131
373	49.4945806	52.01019366	20.78080728	9.833476951	26.28745045	21.83202563	19.89246699	10.71046984	19.77952933	30.19981538
374	51.56032357	51.42166096	17.0813644	11.1513351	23.74478479	20.94358475	21.32821781	11.72972167	16.22057456	30.20954753
375	50.08906912	51.25923307	23.06277951	11.97371931	25.53895586	23.03820302	23.02437342	11.60384286	18.21883691	29.09621426

	V	W	X	Y	Z	AA	AB	AC	AD	AE
376	47.75036236	49.60286764			24.11797095			10.32998669	18.61049534	29.45519016
377	52.99625592	49.73928491	15.9109601	10.16771949	21.93993448	23.72889004	20.09154986	12.51741004	15.89851577	29.82599121
378	40.83582699	47.40290192	21.44493551	11.3672201	22.03558775	23.44972516	21.35395075	13.46623389	15.76907911	30.92248258
379	58.00966691	61.99889656	26.29808171	10.80793572	26.3708435	22.98059199	21.61316551	12.8433675	17.05980653	37.09358111
380	46.81932184		29.5292131	9.343633185	26.8292921	23.77390086	18.28892563	10.01600279	20.3732559	37.05432464
381	62.36380959	58.52417297	31.00008332	12.84568175	28.28516623	25.65140395	21.75087894	11.29270104	22.89001984	38.58225408
382	51.77679593	51.66228773	26.61924166	13.64959758	24.80511998	22.29244831	22.09698983	11.81058301	19.15162137	31.41941213
383	48.16904945	52.32642562	22.96686473	10.21530765	24.43432829	23.7297438	18.90771272	12.07751467	18.63728607	33.59461159
384	56.57621325	60.54963654	27.92518856	13.7828028	30.92550159	24.39585536	20.47134285	12.19699822	18.05400677	33.63451632
385	51.85171685	57.41780423	29.79035415	9.514447555	26.40755698	24.4516105	20.41140285	12.19115135	17.74652617	36.10814742
386										
387	51.3887577	52.98032585	23.49159011	11.69344659	25.89504375	22.95857052	21.09015203	11.36008802	18.38435202	31.16126004
388	4.497617865	4.160283295	4.331306984	2.018421141	2.913896853	1.38616292	1.715947437	1.245639703	2.404541032	3.481950993
389	40.83582699	46.87274829	15.9109601	9.27171288	21.43245734	19.67147097	18.14784839	8.848724002	13.87968204	24.21394543
390	62.36380959	61.99889656	31.27101343	16.49881118	32.3564503	25.65140395	23.93399238	13.46623389	23.25595315	38.58225408
391										
392	55.49556332	55.83941969	17.63081163	11.78426021	27.4831862	23.81443751	22.28367517	11.00650504	19.83055665	33.86648005
393	53.79295752	53.13309233	23.91077139	8.56420401	23.22114887	23.02253156	18.88987005	11.95456163	15.89205068	28.21595454
394	49.8991732	47.52329929	21.5721463	10.20037287	26.66642018	23.34078937	20.87463357	11.69552914	18.9011505	30.64773241
395		49.53862675	22.22271819	15.84242426						
396	48.90997725	49.86617905	21.68854171	17.5196453	28.47953218	20.5676057	23.0410483	8.623256414	19.96709421	28.56116664
397	49.85666969	51.29672692	24.45003056							27.91601943
398	48.23747766	52.44182801	20.77068398	17.17599361	30.11495288	22.30826375	24.34840521	6.757444509	21.29102308	29.18725609
399	49.93085675	53.18929963	23.85092146	9.782185315	23.1522131	25.15078303	19.44409805	14.28507384	16.64348925	34.79452237
400	57.13268106	58.69559466	24.33199457	11.96919076	26.68638276	23.02341757	18.89642506	13.85770809	17.71755633	32.87254591
401	55.73542423	57.13149758	26.30765325	8.864133911	24.51814249	22.48362983	20.35001136	13.28182344	16.86637406	32.14629133
402	51.44915646	54.76386005	31.72795902	11.47874002	25.63768735	22.3891728	21.87983735	13.5630603	20.56994807	34.49751447
403	45.20178903	49.99358127	17.71918597	12.45859673	23.60224378	20.38179368	20.88080763	8.206825571	16.81062523	26.01309002
404	51.37814372	54.91324231	22.703046	8.047400388	24.46007733	23.35565925	19.36135636	10.92036257	17.56876542	33.65540059
405	51.03405197	53.39136952	29.99705127	8.326712009	26.71323454	25.66967591	22.83256605	12.16461656	18.55418428	32.71467667
406										
407	51.38876322	52.97982979	23.49167967	11.6933738	25.8946018	22.95898	21.09022785	11.35973059	18.38440148	31.16066542
408	3.362872062	3.145100386	3.963860967	3.294448326	2.191949451	1.552992252	1.796367686	2.400549259	1.738623053	2.898461939
409	45.20178903	47.52329929	17.63081163	8.047400388	23.1522131	20.38179368	18.88987005	6.757444509	15.89205068	26.01309002
410	57.13268106	58.69559466	31.72795902	17.5196453	30.11495288	25.66967591	24.34840521	14.28507384	21.29102308	34.79452237
411										
412	64.53299013	61.93771217	35.07540818	11.95477835	27.0880138	22.10242847	21.81615195	10.37179315	20.2584801	34.12691331
413										
414	64.53299013	61.93771217	35.07540818	11.95477835	27.0880138	22.10242847	21.81615195	10.37179315	20.2584801	34.12691331
415										
416	64.53299013	61.93771217	35.07540818	11.95477835	27.0880138	22.10242847	21.81615195	10.37179315	20.2584801	34.12691331
417	64.53299013	61.93771217	35.07540818	11.95477835	27.0880138	22.10242847	21.81615195	10.37179315	20.2584801	34.12691331
418										
419	50.2315056	50.21028561	22.9914149	14.57978787	24.01671305	20.34345128	22.43403704	9.037792946	16.27992078	28.23478269
420	58.40677074	60.61143855	35.07440197	9.522750509	23.98906603	21.69863658	23.11450386	9.468187472	17.29945596	30.71957275
421	59.73596361	61.90980592	39.59100028	11.27224262	26.87240778	22.94346793	21.07017048	9.504563319	19.31888777	34.10185471
422	51.54261374	53.91596574	19.7199558	11.56373374	23.45771272	22.00463126	20.25147659	8.771323378	17.55262626	29.75197998

	V	W	X	Y	Z	AA	AB	AC	AD	AE
423	58.06858927	59.53794469	35.59931009	9.95473575	25.13814997	19.9047074	21.64455473	8.119812181	19.19337591	28.14580885
424	65.01865705	57.34368033	33.88706708	10.28208395	27.13212294	23.23126296	23.17343113	9.186674642	18.55504886	32.9470728
425	62.13215208	62.89457562	34.30888246	13.06408116	28.04055869	21.33853186	20.70304567	12.55574063	20.94988684	34.28884847
426	69.47064892	64.86204692	41.51282506	11.4658307	28.15584559	21.37454063	20.79456781	10.47160136	21.63281091	34.82373131
427	72.20010972	64.44648214	42.01454203	10.94594613	29.82422971	25.44526627	20.86171546	9.925052651	20.91399399	41.61199878
428	75.27806204	69.37295229	29.18594613	12.72793813	30.3958402	24.27293432	20.63989276	10.78443422	22.38552084	39.20501554
429	70.73183567	61.18968838	34.47975086	13.03461039	27.32149928	21.95064448	21.10043068	13.12732043	21.61689098	33.10429333
430	59.01358525	60.64244566	33.81030886	11.60987037	25.267891	21.8013004	19.96978739	10.10167684	19.79362092	33.42824938
431	70.98277057	66.47048015	39.51733591	11.1506459	28.03201593	23.61910728	22.5053852	10.32875145	20.97255868	35.64080954
432	60.93266665	61.58207874	39.4221143	12.23848156	27.07399613	22.41359896	23.74585406	11.65310658	21.08405844	35.63337439
433	64.84702118	64.43564778	30.01126483	13.30136112	28.00747126	21.8478362	20.15819067	10.61249579	19.07697947	33.10280402
434	62.51727561	62.97885961	40.54588566	17.28569397	27.1733342	18.80190952	22.77343441	11.59265897	20.78080129	36.97253954
435	70.76050835	59.67279996	42.0874969	12.59075225	28.42311289	22.66722474	23.10848498	10.32954745	20.42204502	34.63783332
436	71.18987634	61.85405234	41.22153245	11.35297259	26.36821082	22.02953474	24.50332166	9.83020013	22.36760065	35.32053816
437	68.60207728	63.63542784	38.22709798	11.21279799	28.18665694	22.9713186	20.98920205	11.57619838	22.19595308	36.29995
438	64.56517295	63.91908016	31.15424924	11.4379345	27.25687718	22.03360389	21.24891846	9.253393796	22.97605559	33.40806396
439		63.75398782	38.34110676	10.4760989	28.58858019	23.43046567	21.59173065	10.47557223	21.13330505	
440	69.66748604	66.44709529	34.30960389	10.75298614	27.45650869	22.76896483	23.35265073	11.79846692	20.37609609	37.83604466
441	60.22476458	62.40814187	32.52570466	10.46856721	28.5103065	22.8799329	19.02209295	9.592169976	22.60215419	34.40847806
442	65.48878883	63.64733667	29.91509101	9.671169349	25.33049245	21.00726541	20.27131777	12.29979973	16.12743271	30.34778817
443	68.75529494	61.94443815	38.55350023	14.38072588	29.41799291	21.82956654	22.14745729	9.139976549	21.9661183	35.55958136
444	68.66814876	65.7454083	38.78288415	14.3936947	27.3270292	19.79326949	23.52957253	12.89689552	19.57422283	34.61281607
445	59.35296249	58.63323952	35.68656944	12.56695346	25.51121298	22.03302467	23.35789842	8.975433488	20.35672996	33.15994641
446		60.2037585	29.61543506	11.43824948	26.18949449	22.43320362	22.77291214	9.017722367	19.71360721	
447										
448	64.55328109	61.93818373	35.07472421	11.9550963	27.08804749	22.10247152	21.81557277	10.37237748	20.25777709	34.12706832
449	6.372092741	3.843846902	5.569653457	1.728469282	1.737051826	1.376564257	1.389715858	1.353151511	1.843007327	3.08847831
450	50.2315056	50.21028561	19.7199558	9.522750509	23.45771272	18.80190952	19.02209295	8.119812181	16.12743271	28.14580885
451	75.27806204	69.37295229	42.0874969	17.28569397	30.3958402	25.44526627	24.50332166	13.12732043	22.97605559	41.61199878
452										
453	67.61112706	65.18043521	39.52558541	14.93167679	30.26366245	22.74158084	23.09934934	12.90805676	23.44701687	34.31321707
454	67.30228626	64.59558158	33.07263207	12.23717469	29.40270486	24.54346092	25.03480613	13.11123751	18.42403447	31.15726379
455	73.99574151	67.48877355	35.890136	15.34494699		22.22690758	21.64219321			41.80529215
456										
457	69.63638494	65.75493011	36.16278449	14.17126616	29.83318366	23.17064978	23.2587829	13.00964713	20.93552567	35.758591
458	3.778470315	1.529762479	3.235105041	1.687670112	0.60878895	1.216420961	1.701916538	0.14367049	3.551784922	5.469182419
459	67.30228626	64.59558158	33.07263207	12.23717469	29.40270486	22.22690758	21.64219321	12.90805676	18.42403447	31.15726379
460	73.99574151	67.48877355	39.52558541	15.34494699	30.26366245	24.54346092	25.03480613	13.11123751	23.44701687	41.80529215
461										
462	63.48071342	61.76538782	27.82193465	16.47039408	28.25545193	21.1584807	23.69438826	12.81945792	21.60606188	32.59244453
463	66.45543282	70.01544042	28.4922889	10.93191728	28.15554823	24.53154781	19.41488917	11.81619202	18.06847693	36.8888117
464	72.57926693	66.52795264	41.57616267	12.1416256	27.62898898	21.14911277	19.70013649	14.3741485	19.23308862	36.54515409
465	68.74607526	69.20330274	38.54409915	15.50251697	29.46444991	20.47134268	21.1545742	12.70082754	21.50540237	36.61109393
466	76.12179868	76.93679913	43.20025654	15.27668352	34.02158297	26.24024857	24.21075841	10.95826465	21.67029744	37.55572593
467	73.7030857		42.42638107	15.83928392	32.24115394	24.90810903	24.70746057	11.99305052	25.72192355	35.56662835
468	68.87075982	64.77565084	34.66071548	13.12538004			26.65399521			34.00800686
469	68.79938647	68.01606597	34.50913365	12.23564154	31.26221366	26.35055282	25.11240932	11.1475178	21.1749901	33.11752149

	V	W	X	Y	Z	AA	AB	AC	AD	AE
470	83.48407777	72.58992849	36.54836077	17.33842062	31.16396545	23.7594934	26.95335197	10.10740681	20.71635427	37.24366911
471	73.29100326	58.32240041	47.74018725	16.88408272	30.0312794	22.60810883	27.8068562	8.122732536	18.225334	28.30345418
472	69.66278872	61.44368833	51.18512593	15.2566891	29.18757275	21.76861453	24.27490918	10.44310849	23.46345256	34.30947382
473	67.99721603	68.68266666	26.42827366	15.49541984	30.53706703	24.51708071	25.62337777	16.97918583	20.82977875	36.7122275
474	66.27123199	65.13470716	39.85617759	15.74299375	31.02045253	23.97965116	23.99087714	12.20460657	21.30296774	39.13003243
475	67.69682674	64.39779212	36.94901547	13.95526267	29.04462319	22.14234997	20.97615435	14.75024224	22.41139169	38.11821165
476	69.96876337	65.51118219	26.6353428	11.39593454	29.00108162	22.72086931	21.47698597	14.64215821	20.74127695	38.16918841
477	67.75753152	62.69002486	35.39985686	11.43855196	28.12707759	22.89811182	21.2470256	15.29983827	18.78867019	37.01745229
478	68.84694885	63.85062675	24.06867411	12.18901635	30.8992717	24.79347307	20.13144182	15.01580704	23.10827416	38.0419275
479	65.18072064	63.10125931	32.93929445	13.32996874	30.26027338	24.12683143	24.44266691	13.61325835	20.86318169	33.35372326
480	67.70644099	61.70357434	39.52147315	14.1187447	28.66735777	21.01061659	21.82933291	14.1473936	20.35928932	35.68617633
481	66.09279745	64.67816786	34.7533862	14.74505501	27.85582008	21.12336679	21.78272003	16.04787289	17.98787694	36.20974356
482										
483	69.63564332	65.75508516	36.16280702	14.17067915	29.83290695	23.17147168	23.25921557	13.00963525	20.9356889	35.75903335
484	4.475878608	4.388761508	7.208498269	1.96674747	1.677075031	1.805268396	2.506372256	2.276429132	1.970630378	2.536921863
485	63.48071342	58.32240041	24.06867411	10.93191728	27.62898898	20.47134268	19.41488917	8.122732536	17.98787694	28.30345418
486	83.48407777	76.93679913	51.18512593	17.33842062	34.02158297	26.35055282	27.8068562	16.97918583	25.72192355	39.13003243
487										
488	102.5083812	87.14617759	66.93435656	14.03955773	36.39996847	30.24457376	22.7845595	11.84739357	24.20878873	55.96540769
489	78.64440634	77.45766464	52.62249181	13.28775594	28.83421421	25.95615779	24.0745595	11.91889365	21.41845709	47.35886483
490	87.33676088	74.45825735	55.17928785	15.675308	30.66617571	27.72113661	25.3645595	13.9473016	20.9668478	42.66158915
491	88.52957451	76.35348328	50.43452079	11.5996183	28.60624816	26.13519299	26.6545595	13.48434766	21.32672448	38.23795668
492	109.162283	88.6957888	75.31048533	12.73760595	27.45169407	25.5112333	27.9445595	23.51952088	19.8617172	51.4917978
493	85.04669704	72.3956469	53.23983875	12.54933878	27.27968379	22.04184827	29.2345595	15.23928873	20.23584194	45.01957283
494	81.47484059	76.05121128	52.00582914	13.41945873	28.20086194	24.16092047	30.5245595	14.6520783	21.06767526	43.36871376
495	81.57649926	70.81809714	50.28859512	14.94632576	29.11862046	23.70567349	31.8145595	10.28329936	19.91722288	41.54117358
496	81.05537877	71.25169076	54.1439054	18.31636372	32.36301839	25.98652213	33.1045595	14.09093508	21.46150707	42.84597863
497	85.19266672	69.85125017	46.72799467	15.21616508	32.17304973	26.56287414	34.3945595	11.92211561	23.3490759	38.84242658
498	87.95962046	75.36990771	55.75454553	15.81208352	29.60710806	23.12063052	35.6845595	12.4038028	24.08450186	39.46522959
499	82.53461575	75.76023298	51.68261979	16.71787768	30.18377593	22.3439798	36.9745595	11.25515468	21.38454967	37.16394122
500	83.00093803	71.20557697	46.3239283	16.87074154	31.35657568	25.8004056	38.2645595	13.32670412	21.64190641	37.65098703
501	81.56930765	74.53919004	54.58564969	15.10599483	29.37520448	20.0749411	39.5545595	12.07174148	23.14963116	39.14443665
502	81.90918928	71.20193347	56.0583942	16.9122701	31.83928807	25.69410995	40.8445595	11.90038963	21.04466165	38.86407942
503	85.19421169	71.95888729	48.89204682	17.46894748	31.23102892	24.4748927	42.1345595	13.68581781	20.79346704	40.25759022
504	91.99710149	75.12486094	50.18584217	17.19712792	32.13432966	27.67066252	43.4245595	12.75885897	24.73473658	42.14588764
505	85.07087464	71.66712491	49.33969194	17.24523035	30.90012798	25.90846927	44.7145595	12.01683895	22.4796122	39.80307647
506	88.57437389	70.28248281	55.24435679	17.79209188	31.48921705	25.41387406	46.0045595	11.96142324	22.75469632	39.13853463
507	77.98686961	71.00754365	55.89112743	15.23408702	30.67333497	24.15835436	47.2945595	12.37374275	22.24615848	40.12450358
508	91.24780295	81.26002986	51.39097651	13.02962574	19.70371046	25.2067199	48.5845595	22.11526986	20.43992601	46.64847907
509	76.15151621	64.53611459	54.80005803	12.46089484	21.39089068	23.42587258	49.8745595	20.24516574	19.61656179	46.68845824
510	100.3564412	79.64917721	50.46685143	14.2034931	19.20584649	25.53663192	51.1645595	20.64789876	16.01244395	47.13962315
511	92.34918659	84.42224964	52.63509616	12.13368394	19.63496298	25.4304137	52.4545595	23.89486372	18.64058959	47.78862212
512	81.71297878	65.10370676	58.26484971	16.46766061	21.18548664	24.95779276	53.7445595	25.90339112	18.98731793	45.8502225
513	97.02452351	81.74577929	50.29124386	14.13176201	20.06993041	26.06516006	55.0345595	23.19123486	16.38800875	49.18870028
514	80.74875127	73.68026474	49.5954657	17.62172166	34.02018946	26.16373682	56.3245595	14.13990895	21.13795622	39.41338335
515	83.89727344	70.01415763	53.20127971	18.70548606	32.58799291	26.24206613	57.6145595	12.84881486	21.87631119	47.81773754
516	81.66071677	78.73152747	51.17448084	15.54743923	31.25572204	24.40676703	58.9045595	12.76792189	21.46073652	41.06623769

	V	W	X	Y	Z	AA	AB	AC	AD	AE
517	72.21951785	71.42845199	51.00808552	14.66271418	29.32547357	25.35517803	60.1945595	10.21501839	23.03397962	39.67500281
518	82.26069115	77.84090629	56.4983479	16.02236047	31.47624473	27.18928762	61.4845595	14.51230886	22.01002629	40.26765683
519	92.99031739	74.87549826	56.25142012	13.66618669	30.2514533	23.54817504	62.7745595	12.43527834	20.26059808	40.45091799
520	82.08822278	69.85314838	48.35005941	13.37353161	29.65032053	25.30607906	64.0645595	14.0383896	18.10895132	38.58525766
521	77.95406617	73.39684369	50.56017507	14.00514194	30.00923718	25.37741139	65.3545595	12.82088104	22.75539515	40.49128249
522	82.21203569	72.47534749	47.90419491	16.20691013	32.02744451	25.7720968	66.6445595	12.7418811	22.727391	41.2161116
523	81.92907797	70.93389992	50.88510175	14.81090046	29.95914495	24.89392661	67.9345595	14.74866874	20.56419475	37.0813633
524	104.3115933	85.51509444	73.59585835	17.42242177	35.09143798	27.33067107	69.2245595	15.44964223	27.97853057	54.5097119
525	83.1044636	72.67338437	52.11830176	16.27629715	30.05326799	25.24811454	70.5145595	13.60410552	22.75136845	39.76656129
526	91.51506288	75.24257103	49.02464504	9.841679963	22.03847394	22.87208905	71.8045595	22.13603727	20.14108867	45.24280192
527	91.72637362	73.40837197	47.58011851	11.75638185	23.95556332	25.34128398	73.0945595	20.87079177	19.90788241	47.43192477
528	74.68754184	71.49973845	52.08194462	14.45734709	30.14129713	26.05998173	74.3845595	11.60580199	21.72417848	36.80646078
529	88.57465961	67.69342975	68.51317325	15.73254722	31.97849837	28.0224648	75.6745595	10.37974169	23.45803865	46.19818984
530	86.40106264	77.93429389	49.74334499	13.66785605	24.38159682	25.50232093	76.9645595	21.11995717	19.78132039	50.65264468
531	94.34834642	79.13470422	60.1501447	16.28655345	25.58116286	26.68802472	78.2545595	24.12155443	20.12787858	54.94689362
532	84.12723562	74.05700341	49.4645651	13.84965506	23.07468293	26.20486258	79.5445595	21.00673794	19.28849188	49.33013767
533	91.30973984	79.91067479	54.19754632	13.02290874	24.72794618	25.389188	80.8345595	20.19346736	17.584775	46.37166428
534	82.73954351	76.81824738	53.45364371	10.42315812	21.35943199	23.9937254	82.1245595	22.77054204	19.8087379	48.89672358
535	90.44777154	75.13608581	63.05518528	11.76771851	23.44047142	26.60335536	83.4145595	19.14829305	18.97313443	54.02138037
536	95.92490663	70.87831005	47.29415385	11.39838421	21.26482586	27.24102386	84.7045595	19.64271375	20.20457568	48.03759251
537	91.48393795	80.85385802	56.11497859	12.10365506	20.63675821	21.63389824	85.9945595	22.9125886	18.21295196	50.16726232
538	82.98721812	69.8155939	48.45662538	18.2538444	29.79246656	25.99939755	87.2845595	12.41731427	21.7057742	40.77559347
539	78.34352551	75.89771137	56.49821521	17.83949259	31.41074466	26.71179194	88.5745595	11.78076067	23.37473888	39.57424067
540	77.79439644	75.84636237	49.81216813	14.42133907	29.00809392	25.85608351	89.8645595	11.40780698	19.92874396	36.89812026
541	86.91579777	68.60541962	30.2327701	22.96221729	33.27261484	13.28698921	91.1545595	29.15186498		25.01805108
542	84.57061193	75.45110058	53.92976758	15.08588286	32.36478947	26.83481414	92.4445595	13.13416186	22.70545106	37.6084105
543	75.50228139	72.49119671	51.57165395	18.41303065	30.41675923	24.44112766	93.7345595	10.93485082	23.98939227	38.27678247
544	88.29709564	75.75173241	54.98695568	14.71140548	31.60895763	27.53765153	95.0245595	14.76810744	23.74313542	44.16530057
545	77.40575813	71.28685446	52.24471888	11.88991722	29.14196111	26.6544179	96.3145595	13.27186335	20.79516182	41.13543059
546	79.67524411	73.75328475		14.36251431	31.78190618	27.50962046	97.6045595	13.49292855	24.36341555	40.83610231
547	77.40606614	76.67710277	49.09829139	13.82299324	28.55339672	22.90604887	98.8945595	14.28524071	20.39275154	39.34282394
548	75.48293768	70.07279081	46.66961632	13.18101363	28.48742891	23.85514698	100.1845595	11.22756206	21.6187424	39.13700366
549	81.1994324	70.0474902	48.91110056	13.37539192	31.11351636	27.25696545	101.4745595	13.56078079	18.94541757	41.15858935
550	80.54232826	73.73937596	51.2997272	13.38277347	29.72954597	26.26410875	102.7645595	13.68140966	23.77312512	44.28358956
551	76.22654067	71.27114712	47.6043095	13.22515521	30.32108967	24.99943578	104.0545595	11.38043535	24.30449623	40.98903684
552	77.15732001	69.31145918	51.02178908	12.49514124	28.92677542	25.56932327	105.3445595	11.71225317	25.45026105	36.22467898
553	72.96152966	72.90352437	49.26983531	12.3605413	26.85490938	25.30547078	106.6345595	13.00929831	21.28098272	39.73500962
554	81.18913725	67.1453619	40.80972394	12.3602313	29.18535198	24.511747	107.9245595	12.23865832	21.35835431	36.2478265
555	73.20139941	64.61722533	55.07802452	14.56047846	29.23919764	24.31261832	109.2145595	10.6060202	20.77633203	40.71282433
556	83.05794222	71.58048076	46.78584774	13.17234973	29.32822596	27.32488125	110.5045595	13.08905213	17.61200038	41.54083322
557	84.09775705	73.6379821	42.64149333	15.06097243	29.04986187	24.99360819	111.7945595	13.18491973	19.36734892	39.53061643
558	85.50368743	71.38744682	51.76602908	11.37675826	30.1713055	26.48072799	113.0845595	12.08292833	22.69298798	40.93004922
559	83.89657804	71.05343161	55.46195134	13.67957098	28.53412691	25.54526925	114.3745595	11.29585378	22.36077854	42.41075461
560	98.47607031	82.61610319	72.01049776	15.93512648	32.6676035	24.79096567	115.6645595	14.5060906	25.49529767	50.34859095
561	78.00459986	70.69765765	46.92731201	14.78696806	29.52135276	24.80110242	116.9545595	12.93692675	23.09643609	39.75910316
562	73.1344926	67.68345233	54.41378416	12.05641536	29.55204743	24.74695404	118.2445595	14.25108373	21.81158918	41.37737398
563	79.63317833	67.40673167	50.13342294	10.80054192	26.18600805	23.22223323	119.5345595	14.08664601	16.12153262	39.26145828

	V	W	X	Y	Z	AA	AB	AC	AD	AE
564	76.02580932	69.30292746	51.67907974	13.53428957	28.35252693	24.42390925	120.8245595	13.35019983	20.38555643	38.79416626
565	78.48326196	71.16994615	52.36698153	11.94393213	28.57553325	24.20501492	122.1145595	10.58122124	21.68184833	36.96519656
566	79.81305119	68.57139737	62.46391951	13.97742581	28.31826849	24.27928542	123.4045595	11.25199944	23.92365826	40.84935088
567			58.69240547	15.69394987	31.94886438	25.31481117	124.6945595	14.22029616	21.75639546	40.29218852
568	80.79177678	65.81688281	54.29007003	15.76755614	31.03770746	26.0894203	125.9845595	10.99813961	25.34513589	41.73388253
569	89.20605191	71.54652508	52.12152244	17.06405497	33.00965404	29.0402624	127.2745595	12.45645376	24.74966773	43.96293709
570	83.6865276	73.26115614	47.18714038	15.09590437	29.39653862	27.76187967	128.5645595	12.51352407	19.57841655	42.0923209
571	82.52737463	76.6923357	57.22248618	15.1370254	32.7818383	27.26507561	129.8545595	11.53501468	21.69419976	37.55410261
572	79.24995108	72.49623724	49.08749161	14.3235169	30.24784954	25.74724386	131.1445595	12.19146172	24.30678786	40.88578382
573	85.25641669	76.6244686	54.40707459	14.12180277	21.509658	25.32909374	132.4345595	20.21207989	18.67896537	47.65478225
574	88.95220127	82.41759766	49.12777034	10.77322349	20.41888644	24.65053314	133.7245595	20.60172416	19.95585408	50.30222816
575	89.99449253	85.03174192	50.70373948	13.4691923	22.5965592	26.1663111	135.0145595	16.94962368	21.67565789	48.92813092
576	91.53542908	76.98758812	49.28926521	14.40246335	20.9946824	27.59830448	136.3045595	20.34978242	19.72973858	48.24661142
577	97.56866733	80.5328235	53.92834869	11.82980191	21.71409064	27.17395291	137.5945595	21.29217347	17.55685086	50.81378186
578	83.99357619	77.93475829	55.54865904	11.78100775	19.03118582	24.07359318	138.8845595	21.34609136	17.82960435	47.29909722
579	88.46244601	77.87858237	47.48698002	13.73819716	19.35204744	25.63113124	140.1745595	18.0237841	19.01341627	45.30749667
580	87.48138214	78.93728714	44.08730976	12.82259707	19.59663502	26.14138486	141.4645595	19.34395791	17.90972496	42.88335633
581	91.61093805	73.25770056	59.50714256	12.81717955	31.04029437	27.33423538	142.7545595	11.50452347	20.26194254	40.09587545
582	83.1257263	70.77297667	52.71146829	13.82204914	31.05379511	24.18323456	144.0445595	11.13288638	24.46970346	40.05058757
583	81.64077682	73.21641367	50.01885692	12.36668295	31.22982222	27.10643155	145.3345595	11.81723742	22.44111051	37.35501722
584	105.1413904	91.17976583	78.16085131	14.7097173	32.20321512	27.79558714	146.6245595	14.08732505	23.28489826	50.6758095
585	77.35580408	70.85330242	53.25975185	14.49954826	30.94193125	25.47429676	147.9145595	12.91164361	21.34022027	37.94581932
586	82.1598244	69.18443406	52.9006698	13.38403893	30.78998661	26.48963082	149.2045595	12.3724639	21.20685536	37.17431615
587	94.10895182	76.00603863	62.32324298	16.3580304	32.79840286	26.94270012	150.4945595	12.48706308	24.27854835	42.76421625
588	84.94606195	75.1862604	55.04418739	14.36305757	31.53231354	26.65131225	151.7845595	13.33793376	17.76150981	40.88432846
589	82.67055728	72.7877693	54.53969658	14.88503059	31.37349637	25.4050086	153.0745595	11.39068165	21.92473321	41.83378407
590	86.22570648	73.71919199	53.49043743	17.44721505	31.34574987	26.13749875	154.3645595	13.76574963	20.18393223	40.4051977
591	89.44103036	82.65217832	64.63378272	16.98104474	33.60862274	27.36167412	155.6545595	11.39328341	24.93355501	42.20754791
592	83.17393992	73.24667838	52.63394518	12.91823117	30.36635131	25.93111969	156.9445595	12.48182622	23.00890637	41.47440855
593	90.21250217	77.29197418	48.70118291	17.65521546	32.59164958	29.84071728	158.2345595	12.67918274	20.61985078	43.04488185
594	88.83942043	75.28551261	52.25203217	19.26729368	32.44990928	25.93010024	159.5245595	11.14423623	25.04262123	42.03130648
595	92.02034123	84.00520633	67.74824953	15.71850853	34.63181005	29.14364369	160.8145595	12.5758291	25.96271642	42.51295541
596	80.95474384	75.76060073	52.15574042	17.19456731	33.72441969	26.98391661	162.1045595	13.96387142	21.99283067	38.22230647
597	83.16805455	72.53854135	48.59436264	16.96319809	32.57930928	26.7182992	163.3945595	13.12738152	22.07039667	37.62238769
598	88.46557895	72.25436211	54.90241853	18.03396019	33.29533391	28.68310184	164.6845595	12.5677401	20.27910339	39.47823922
599										
600	85.04347855	74.34953693	53.19467903	14.60930274	28.75695467	25.60736027	93.7345595	14.74181734	21.41809347	42.52669683
601	7.117731531	5.050292857	6.684153165	2.21951847	4.241778847	2.016391859	41.5211705	4.115875953	2.270528045	4.890577852
602	72.21951785	64.53611459	30.2327701	9.841679963	19.03118582	13.28698921	22.7845595	10.21501839	16.01244395	25.01805108
603	109.162283	91.17976583	78.16085131	22.96221729	36.39996847	30.24457376	164.6845595	29.15186498	27.97853057	55.96540769
604										
605	88.60153586	76.59376279	50.79028413	13.23415413	32.92943801	28.23799642	28.51106949	11.48748323	23.36268943	41.71611108
606	90.31498345	75.85211483	50.26112604	14.37974809	28.19098462	25.23339969	22.7652025	10.53130862	21.49108056	45.23401855
607	76.77529607	76.53052058	47.62886726	15.84938596	28.7399449	25.51167247	24.43092415	12.57123878	21.67551504	47.91146568
608	79.49739967	73.39294964	47.50003536	13.22323798	31.35685392	25.50707168	25.3446258	12.93635886	20.69830462	36.43108556
609	85.51136201	75.11847419	48.80019351	15.99986695	29.32734634	22.2612893	22.21373649	15.67498148	21.33309353	40.44532374
610	94.6009655	78.34408225	56.28608705	11.46938719	30.75617693	28.37823465	26.28768185	19.28649994	24.41311648	45.55655864

	V	W	X	Y	Z	AA	AB	AC	AD	AE
611	96.43307515	72.52972042	48.15286515	7.530036416	26.75174631	26.11727227	22.356646	21.38756887	20.53343788	46.39892049
612	82.66094815	74.31127796	61.54068259	11.91253385	23.67225977	22.85520899	21.1364741	17.41452021	17.71746528	42.5463474
613	84.34582887	69.98274725	49.33909769	10.07924123	25.33821832	23.24429485	21.74708528	15.91157169	18.83546474	44.8889141
614	82.57189286	66.41467593	46.14775569	13.3882048	25.09637046	23.0620284	21.83443718	14.89731607	19.70092911	39.72947645
615	86.80134017	74.00325134	48.94172812	15.75385114	31.67261796	26.20502462	24.95305108	13.31175691	19.81439523	38.82025934
616	96.7039725	78.2793025	57.25663859	20.24823668	33.11007968	26.7663402	25.60156842	13.54729593	21.50154561	44.043252
617	85.43033034	67.45721376	50.29717709	17.0191145	32.91378849	25.63035316	24.06144602	10.94804197	22.82476408	38.14165735
618	76.80832189	77.95913568	57.11113102	13.71780282	29.82840532	23.93826213	24.67196678	11.61874309	22.54755581	38.16269305
619	100.0724462	88.47669362	56.73145072	15.36450072	31.12824381	25.37655331	23.29839371	13.20107312	22.16305714	41.24202863
620	76.23668965	67.13100117	47.99478903	13.50632971	18.80623595	24.73274448	24.27541989	20.48185344	19.02922873	43.33746258
621	97.31126651	79.62145208	46.91812237	12.09004189	18.6910828	24.43311784	24.44744624	25.27509116	16.24339	42.81670245
622	73.21654903	66.7550156	46.0861129	11.55653566	18.14326011	24.68464612	24.80459912	23.26051618	17.28769979	43.69287289
623	85.51136201	75.11847419	48.80019351	15.99986695	29.32734634	22.2612893	22.21373649	15.67498148	21.33309353	40.44532374
624	89.49219414	77.12371086	45.28305787	13.7800029	20.01920538	25.44015181	25.37578088	20.27155176	18.60530606	45.83683049
625	81.02910815	74.30037357	58.5356186	15.49625868	31.3877789	24.55503404	22.06581315	13.31050932	20.41390823	42.14784538
626	93.64921304	77.91582598	63.8081117	15.99950563	32.40421097	26.26813947	23.94111456	13.40193014	22.45022529	42.30546769
627	83.2502234	77.86054716	56.96083477	17.61755553	31.51453936	26.74068077	27.85658273	11.44521862	21.79640562	44.56822407
628	95.15765301	77.32577045	52.36571879	16.40550438	32.09493997	25.87858932	20.70399193	15.1764713	20.74215489	44.90222774
629	71.85024017	69.00931515	47.39791541	15.44747433	32.84676968	24.89088466	23.08909664	14.00029402	21.39275907	38.05414964
630	84.88132817	71.22068741	67.77768294	16.28056531	33.13498539	28.24704024	25.16143549	13.01309097	21.94542308	44.68916625
631	88.83041422	72.48985907	62.06826022	16.54165699	31.96664185	24.73365452	23.74818062	13.95239197	22.06658063	42.81065764
632	84.37394787	68.29744448	55.88301299	11.29058015	31.96448415	27.7837855	24.44778594	14.27238286	24.59376049	42.90986412
633	83.57409365	77.19580758	65.41930391	10.62533096	31.08956814	26.51799417	23.55803365	14.65542311	20.76084123	38.92529131
634	78.59538415	71.19237929	60.28690716	17.17154163	31.36644411	26.6851364	27.41789986	11.84760667	24.81416829	44.66676822
635	76.90243139	71.08134014	59.66045796	12.36203158	31.06685127	26.55762497	26.98695071	12.89765688	19.02512196	39.04470481
636	75.15096466	70.2954697	51.40324989	14.78221873	33.04796262	28.32025048	27.41135421	8.765656508	25.1128047	44.54986997
637	81.54229223	73.24539974	51.4782961	12.91533433	28.14096271	24.14121909	23.71203334	13.4532725	18.69974957	36.5160513
638	85.15584475	75.20210629	41.70156622	15.7341048	30.57080638	23.85470173	24.2867192	10.99255469	19.61561914	38.40626193
639	90.06433653	79.6718705	65.16401016	15.31410163	31.58309963	25.68275876	26.93782553	13.90734309	22.81463086	41.56741535
640	84.20674411	72.0702772	55.56070895	15.98169573	30.31749275	24.70918322	25.20324933	13.43797404	21.31891762	37.57249051
641	80.76621359	71.86297756	47.83770392	15.56992844	29.13798279	24.16312106	26.1529257	13.80895531	20.53783458	37.60465482
642	70.60427181	59.0346531	31.38134514	11.39839081	24.14391709	24.84582143	23.11484972	14.09930995	16.64120135	33.07003312
643	99.78777026	75.8218454	46.36445793	14.80472671	20.04868515	24.04294652	22.6841385	21.53087928	20.07585132	46.20833518
644	87.7201617	74.19156883	46.16924285		23.1510637			18.5890801	20.11262977	44.6949698
645	87.02447599	74.7903094	46.6044961	11.26293959	23.71757858	24.90146928	24.40954691	17.17057028	20.88400398	44.79976355
646	95.23653469	77.0740461	54.36194504	7.312426094	24.97701725	26.6880429	21.97398709	23.15748423	20.50942024	49.88942367
647	78.00849936	71.40626024	35.08633789	11.93392573	24.15516934	27.41559792	23.05859291	22.57223384	21.28005938	51.39195322
648	88.65556652	68.7176919	45.29702342	10.90720562	25.08750698	26.98996771	22.54471748	21.63996505	20.60223169	49.09727226
649	72.34100301	63.67392128	46.54925104	18.00195842	32.16136757	21.20787507	23.62452177	11.64843545	21.45746067	36.72655889
650	82.74872254	76.53430772	38.34753253	12.91700938	26.19625685	28.22914426	27.177439	20.66367858	24.64641168	45.55698047
651	87.30935066	73.92845115	56.74929359	14.48864277	25.57448298	23.79080691	23.35550999	16.01988636	20.80570313	43.61923832
652	68.16520248	68.16677032	41.61770207	20.07791591	31.33943812	25.15188915	27.02075507	10.0704442	24.80920043	38.83735395
653	88.81550774	74.86383802	59.90440092	17.52777644	29.29037857	23.07718127	25.35459521	10.97581301	22.86386295	40.57073457
654	87.87621004	74.84963341	66.44378412	16.74253666	29.59068559	27.30553943	27.46253084	13.83062842	20.02946291	42.47154323
655	89.8111419	78.80126563	50.93274206	18.28822341	32.38357043	26.10400657	24.82655582	9.733288162	23.70527541	46.07405044
656	91.45330691	72.24048442	61.01772288	14.27339692	32.65607733	28.13099703	26.87059203	10.35194206	22.82330582	37.69966584
657	86.6883805	74.63344447	65.03278242	16.32771298	33.34181539	28.41062654	26.54488567	11.88944628	25.21501208	41.28738391

	V	W	X	Y	Z	AA	AB	AC	AD	AE
658	80.95074956	74.8827253	54.33310605	15.28274042	32.36633218	27.23327849	24.89569491	11.71524117	22.48094331	46.19255262
659	100.302082	81.88981897	62.99934939	13.91925622	29.84502109	23.54591503	23.27699876	14.82980343	23.59217229	43.24768152
660	86.88682139	75.64274581	55.84716692	14.18892811	28.84599344	26.51045563	24.78234567	15.04039237	22.48442301	44.29459599
661	82.70729981	73.19200923	55.17571998	14.10813765	28.91507931	25.62103074	23.50758959	15.52842658	20.95665123	41.97551179
662	77.54861565	71.21318701	53.09367414	14.63700302	31.30457171	27.85828739	25.13912263	12.31453625	23.61155738	46.82870989
663	96.40904094	80.97738057	55.3299476	13.01104973	20.60190413	26.54615676	25.00770872	17.4095543	21.12121111	42.62977793
664	95.29662875	73.10729277	54.71899103	15.66946809	30.98627076	27.98161605	25.13349321	12.00857671	23.10017566	40.58090105
665	85.21726528	70.26434573	50.46477763	15.68155374	33.31047565	25.86434332	23.30507396	10.97121196	25.18347486	37.36613303
666	90.55179234	74.5781461	45.29143553	12.04701301	19.44462761	23.52020165	17.83669293	20.94733273	16.80169473	50.79343722
667	88.40740115	78.35212164	41.35006523	11.31372747	19.21875044	24.94387188	18.90541282	23.87334274	15.46196099	48.42065553
668	95.93713664	80.06267738	53.87913604	10.68195806	18.59741634	23.97840824	20.14687011	22.11252278	14.746767	47.40362044
669	77.95921101	68.62534555	54.97643839	8.638164677	20.79537898	23.74691434	22.05373208	17.9067396	17.70784738	44.38432912
670	86.81847522	78.38069795	56.47724035	14.65350791	33.54059069	28.0163732	24.64303642	12.61377089	25.89689142	40.46014478
671	95.09332921	78.17905744	50.44955245	9.005721109	22.51723267	25.99092645	21.82182662	22.84939202	19.50272636	50.98921856
672	87.35059242	74.24243659	42.82907608	9.569254212	16.82583875	20.55753371	18.95379195	22.12896949	14.34286605	41.16743468
673	92.33795906	75.59367651	46.71789155	11.62254658	20.53822006	24.87350365	21.30583245	18.68909662	13.92367424	48.59900723
674	80.2356835	72.81718981	46.94271959	11.70841822	18.29100526	24.05715707	23.55944494	18.90795283	17.60642706	46.33793386
675	83.25264092	72.59502868	56.41259648	14.93564308	30.29027116	23.53195438	24.63846982	11.10023728	23.46406584	42.81038459
676	84.04315028	78.34221661	49.91355428	16.99236244	29.83592553	24.21047085	24.72874408	14.79254464	23.53149519	43.81129776
677	81.20569613	69.94119265	49.92393807	16.42472241	30.1618871	25.30462148	24.31429711	11.8074629	20.31929622	38.30665746
678	94.599003	76.94084163	56.54674691	18.16899309	33.74711539	25.37199599	25.27986091	14.25881096	23.05705757	41.67818638
679	82.84497509	80.21809395	53.6017258	14.50064909	28.42500715	25.59234855	26.89044677	12.73894796	21.83678752	36.92301346
680	62.07153679	64.75442993	38.44575492	12.31243617	26.54161985	23.93097197	23.52544391	12.7702206	17.74044101	33.68114484
681	96.81490717	81.0531439	62.5872435	10.1972076	21.02079516	25.60826805	22.96710874	23.88692375	23.57169732	40.09156448
682	89.21173834	73.77596677	67.06326332	9.991201302	17.12111617	21.69480675	17.87213571	22.48798715	14.29700468	47.20351396
683	80.77608007	73.79061563	54.18248472	17.49309607	30.05742255	26.25114594	25.8142722	8.697033687	20.90428613	36.71999386
684	94.11377978	75.80453096	66.43203975	14.07411402	33.60723628	28.13157421	24.70102158	10.85931652	20.29342325	43.89531174
685	82.58008629	71.0686619	55.78211266	15.80733759	32.84981142	28.53490733	26.78049233	13.3718593	18.36949536	39.55095248
686	77.00598018	72.78810919	52.96777506	16.61219105	31.93633751	26.95274769	28.82912851	12.70098588	23.69024238	41.68209281
687	85.96999649	75.53682341	57.46100131	15.92480998	30.86131287	26.8672634	25.16913626	12.7939226	22.11219957	39.3273393
688	79.71707531	75.48863286	51.90867896	13.61004412	30.28218115	25.48404469	24.78957723	12.52951534	23.20542567	42.90845657
689	79.81947299	72.91488328	46.09577721	14.35512054	30.50918271	25.17114427	24.82803909	11.94811137	22.17012111	45.36061185
690	84.32792874	77.62163001	55.28079244	16.56163446	33.36073092	27.77055699	25.24990389	13.09871053	22.5864107	46.82965247
691	89.82515195	77.43952227	64.18121624	16.79047323	31.20387952	24.82285533	25.54940717	12.47542866	22.59915998	43.71774221
692	91.14670374	74.29451088	60.42114501	20.06390791	32.33563724	26.10069585	26.59663794	14.38598336	21.18607551	42.00431415
693	79.4907002	71.6559944	57.34382381	15.39191462	32.46156654	28.22178673	23.93099201	11.58537454	22.84948188	45.28029526
694	88.69757029	82.01228477	66.80404187	16.16643406	31.4293949	26.74987208	25.05691721	14.65349086	23.98931341	47.71433023
695	91.74169305	76.71911347	56.46363692	18.28526024	31.45073228	23.54098982	24.66976347	14.11385286	23.87977557	44.87300264
696	80.13811348	75.93429731	59.73541559	13.18754046	31.09240563	28.98476259	29.12252364	11.98113491	22.70499051	41.9633128
697	77.82174187	74.90921421	56.83651656	17.98131049	30.10828605	26.75393844	28.09458167	13.1180317	22.33776588	45.46459298
698	86.90968068	72.85742955	55.87484458	17.91918467	29.36003636	22.94227028	25.07657773	15.25025589	23.82564519	40.84612673
699	74.6675622	71.43608306	51.76223479	17.34949224	29.13937304	27.96892348	27.20946435	10.77671241	21.29553683	37.89765638
700	70.89631814	81.10523528	56.22764709	16.10653273	32.61105192	25.4105344	23.69529748	11.69157146	25.42910534	47.94892391
701	88.86038806	78.04073661	52.53384953	15.37716693	30.93784794	25.16943922	26.39892094	11.41844792	20.57870288	36.44540801
702	85.80289113	76.12870151	51.61948017	17.33330668	32.79455197	25.31975673	25.80888813	13.70275815	24.66156241	42.397721
703	87.37845487	77.19774907	59.82549659	17.06070394	32.07784562	25.06324209	25.1295115	15.28848547	24.28132484	45.87332242
704	89.90655281	74.4771799	51.18645417	17.36902805	32.51413517	26.19043813	23.90426762	14.98215479	23.15777975	42.06164874

	V	W	X	Y	Z	AA	AB	AC	AD	AE
752	76.90494971	70.22653809	45.96617299	13.59373919	28.12021776	24.81000074	35.15870961	14.25436138	20.81498618	40.12884595
753	11.45633164	7.634985543	10.52257539	2.795008809	4.6692048	2.220028182	31.61746352	3.922881387	3.215649828	5.27466781
754	40.83582699	46.87274829	15.9109601	5.106747616	11.10875057	13.28698921	14.96983934	6.757444509	9.25702367	21.35198253
755	109.162283	91.17976583	78.16085131	22.96221729	38.63925622	31.1267016	164.6845595	29.56833296	35.84423537	55.96540769

University of Cape Town

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
1											
2	SZT-IZT	IZT-FTP	IZT-M3	FTP-PET	FTP-POR	PMM-FTP	FTP-L	FTP-A	PET-POR	PET-M3	PET-JUG
3	25.64363144	56.77359429	75.14668078	51.32631337	50.68101556	100.3868516	180.3616696	138.2618947	38.05270834	74.3135787	15.62509002
4	27.13001795	46.12329798	72.94330429	42.86003877	46.31647942	84.09849208	182.8081325	136.8192527	35.15098681	71.26342227	16.72943094
5	20.84051993	50.63729498	63.47123957	46.63113135		85.46043878	158.2684155	119.7445691	48.09063437	58.8966287	18.73876436
6	19.81229739	49.77052212	59.44398838	44.0392331	48.63064616	88.38659534	143.4226414	111.6963271	34.4704942	54.91743405	17.29419626
7	21.54118542	48.44883561	60.51346341	43.72194425	49.98782157	79.43232783	148.9023514	109.5188083	35.27711779	50.94200964	20.60182235
8	20.21676102	47.11008216	54.84123863	42.38671551	48.22514808	84.38758202	142.9384284	105.9998062	30.68105779	49.43735585	18.5419098
9	19.0420559	47.78900851	62.01688987	41.13227612	45.14777005	90.28042927	152.6614227	117.2758227	34.08305747	60.63818946	17.72519138
10				36.5209273	44.526235	85.97940661	135.8698911	107.6021451	32.06213014	55.94858478	18.91183566
11	19.941629	42.47850903	56.7830423	40.33926381	39.58904807	86.81871341	141.1765975	107.4057234	32.21338584	54.27685584	18.36657229
12	19.44478571	38.53089214	52.80005238	39.43643187	42.42783279	82.21177415	130.2736154	96.90673585	27.29951235	45.1654801	16.08750885
13	21.49305964	44.51386217	55.35936182	41.80771006	49.27664369	78.97266511	143.3013688	109.9871322	35.34306969	48.24385623	20.55194421
14	18.74207134	41.27582836	50.30943316	37.83248534	41.02699656	75.07609068	127.1393072	96.20264899	31.05246712	45.03942847	20.14617117
15	20.33313283	44.04630143	52.98116644	45.59249208	44.50895999	83.23834644	126.6908992	97.05197724	27.88692157	43.67344164	15.99171465
16	29.39857696		56.21042102						33.36953883	48.79784306	16.84490884
17	21.27545423		49.80094005						31.29018953	41.25367945	18.3877533
18	30.46620195	56.67694682	61.00206816	58.23713065	53.84516189	87.32889274	160.6224572	107.618126	31.90407116	51.70374667	17.81488097
19	17.83435177	43.02322876	59.36608353	38.58590865	42.65003585	79.87399772	145.5145155	110.5185172	33.67936285	52.32731334	18.35910323
20	18.79058846	47.40050934	59.42991881	41.89606342	47.81742148	91.69100097	153.8221261	124.650508	31.44668484	55.58553985	20.45560847
21	22.52442276	49.51183166	61.80097603	43.45265989	45.78894115	92.00203379	151.7453222	120.1418842	34.84057576	54.20314535	18.86084315
22	24.21216651	51.25830446	61.55881544	46.81274245	48.05423509	95.3239739	168.5232079	129.5210102	36.02964885	55.44082755	18.92173034
23	19.1297946	41.79592989	53.32234206	40.96287906	45.68665991	82.75198638	135.8324728	105.74521	31.16194547	45.42406839	16.78431185
24	21.33629088	52.30136651	59.93890946	51.33203249	44.56370813	77.49940043	137.0985878	104.1757197	26.39682705	51.58128566	17.22252701
25	19.19508081	48.6821981	47.71099256	50.41713146	44.5722371	77.9513927	140.1020857	97.75508008	24.28167158	46.15111367	16.49459545
26	23.60733093	52.2077695	57.4309779	53.61245039	45.45271705	86.19797147	140.6214081	97.17855579	32.32343163	50.24226847	18.10115783
27	24.71550067	54.50382835	60.5162408	53.69399244	47.91716965	82.66820549	149.1822801	112.0994787	27.61531975	52.53029481	17.48845177
28	18.05476236	44.18500278	52.61128859	40.30208298	46.18171086	79.89289607	143.9408758	109.8350402	30.52142029	44.29507757	20.43861233
29	25.97068808	45.23194978	58.99818451	41.62064491	43.31299342	85.46890902	148.7955545	114.0065381	35.65375285	52.74080859	17.73809737
30				41.74482403	44.75302227	83.67355202	134.6686404	102.9290002	32.00125657	52.57321974	18.2453966
31	19.37103976	44.27157592	53.69964869	37.43850608	40.24447914	86.26592574	132.0313665	103.9981695	29.0216921	50.39900535	20.89778015
32	25.10342921	59.47314582	67.75267073	50.25633697	54.32179599	93.87184998	181.2978392	141.7875584	36.56001249	65.98490663	18.41389667
33	29.39359323	57.60768849	53.32331814	61.91283303	45.47947036	85.44733325	145.3836147	97.52341359	36.3639162	45.47636665	18.45712543
34	28.88092246	54.63819104	52.28437287	61.98883533	49.87741973	79.8334409	158.5719895	112.3660353	28.45457585	48.86876587	14.45938465
35	14.51697083	40.78076758	53.97242192	38.67540747	39.65838249	85.47743646	133.3194338	98.41033259	26.22696472	55.52645731	18.22436229
36	17.11571609	40.86470659	54.18480863	40.24979591	41.15555022	80.10312995	135.966889	102.5992446	27.91436376	49.4970162	18.63641779
37	22.98720253		59.17910811						34.09941023	54.40025511	17.55342533
38	31.32673331		60.71353991						39.7822805	56.81694778	16.63445831
39	32.41240551	62.68536069	60.81776375	61.61763096	49.46439192	94.76477695		136.7071215	37.66831653	53.9584011	20.68248764
40	35.12796203		70.1209382						38.78492605	61.62176872	14.68821818
41	25.75118063		65.85000757						31.90019588	59.3944574	16.47282007
42	22.6234796	47.4360277	59.10696843	45.95138256	47.81169423	77.49391218	130.9110473	98.46555103	31.43857414	55.67617947	19.56828258
43	30.06306459		77.8932316						40.74407528	72.38791923	19.71237885
44	17.71670645	52.2805942	60.27963929	50.45626446	46.57892506	82.00931171	145.2424881	108.0098962	34.34417441	58.22934908	17.26898142
45	21.61105154	52.72216677	60.80123691	52.02150274	43.98775327	92.58412179	172.9674288	137.3686417	37.03429844	56.8437524	20.86304459
46	22.47824292		59.19933776						34.19615398	51.94067617	17.54324222

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
47	17.25791545	43.00732723	55.52858426	38.72872091	44.04784086	87.72999824	150.8962899	116.1837636	34.47287106	46.87235261	19.26824952
48	15.2219456	41.20210548	62.92370842	35.02508972	43.66849692	80.75105906	139.5327769	108.5512621	31.12848002	61.1640208	19.87447951
49	21.31354065	49.78668981	64.81094892	46.82242944	47.90667013		154.4825804	122.4248147	35.42330043	55.32204746	17.65438432
50	18.19570089	50.19330186	66.07966279	41.90819751	45.84285481	89.78306008	150.7351381	116.0224205	32.37303937	59.85528812	19.22719511
51	19.16054629	49.65131608	62.08280513	46.77974838	49.22203122	86.43053436	150.2989298	119.3412861	34.80560245	53.54763661	17.37074682
52	16.76461284	42.80363485	55.04721325	38.17562167	45.79828259	76.48458389	151.4989286	124.3621939	33.02302026	51.39660633	17.74510952
53	24.62356961	52.7234238	62.51262482	53.86512332	49.73475261	91.37422105	160.8312463	126.6094978	35.68759318	50.11086503	19.88270039
54	27.79614536	65.84857394	85.05948567	57.45831518	56.60495428		194.7293248	152.287772	43.72814032	73.86501246	20.83298438
55	24.24429832	63.18678181	81.02708059	52.51944599	55.84288365	112.5998495	200.2021945	164.1193339	42.05807407	77.65465537	21.45566308
56	27.63490421	63.06665131	70.2096755	56.80715509	62.27089269	90.71066036	171.2521385	132.4264501	39.71571236	57.87064912	16.90929686
57	18.56494926	48.67435798	53.16872172	43.98577512	44.41911868	83.20190321	139.6448495	107.1184532	29.46569152	47.18833729	18.77678508
58	23.66027897	49.79203256	55.66442975	52.49708005	45.51691462	85.07970021	150.1419014	119.5126435	50.05334944	37.87401854	30.59071493
59	17.99634027	39.35613056	53.36699307	39.17811381	44.73716404	79.69844757	114.7605847	78.30029253	31.06984507	46.61855266	15.63751176
60	15.25888844	45.9350469	56.8728623	42.54816022	49.60812167	85.24753366	137.5677654	106.0754457	27.76621782	53.41058052	18.78411316
61	29.94523421	54.17976612	57.98756553	57.94311589	46.41752201	85.36938064	152.1832579	105.3403075	31.81843644	50.65557887	19.34756485
62	21.72594876	46.48180176	55.84005448	44.04453549	42.67945228	79.91064614	143.876642	110.9222687	32.48856241	52.21327652	17.78725898
63	21.56869784	44.57057463	50.7070377	42.53874618	45.56278943	83.66567088	137.7454621	102.3215076	29.53686707	43.81454749	16.98891495
64	27.386542	49.9513203	58.15891323	50.05098142	45.17229818	77.52175686	136.6181836	91.77675533	30.79502359	45.35363434	16.82292726
65	21.36362667	47.07413262	61.31403848	52.12700712	42.72248262	93.8735507	145.5871287	107.2550939	34.8972574	51.80677358	15.98087418
66				40.34485354	40.30806091	81.28424249	142.2394001	104.8001408	28.90808547	53.64699646	
67	19.53450266	45.36616696	60.71556737	42.58191164	45.18795531	88.68989931	141.5584257	106.279442	31.90343796	52.66120965	16.88848787
68	19.79169714	36.99349152	50.35164468	37.42438085	41.06881822	75.51967198	122.4735191	90.80327674	28.10488715	39.29478567	15.90861529
69	28.75601054	56.8597231	59.76851977	57.9789361	48.42430286	88.47920176	150.2292241	97.16472047	28.54497753	55.5193634	
70	27.51998053	60.45327843	59.59368214	62.50354974	51.0508975	88.18036442	151.9737724	95.42943543	31.26319454	53.61823846	
71	23.55612192	49.30822945	59.82703579	52.39449181	42.29548664	82.96092234	139.2964104	90.43033873	32.44085175	55.49110953	18.47381622
72											
73	22.66687966	49.19832722	59.75918012	46.60815553	46.42719197	85.41444108	148.1722074	111.8646294	33.33602449	53.49934579	18.32961865
74	4.624838513	6.631076264	7.238975418	7.397421234	4.289640285	6.527675967	16.45650609	15.7493195	4.733856148	7.866134914	2.212141887
75	14.51697083	36.99349152	47.71099256	35.02508972	39.58904807	75.07609068	114.7605847	78.30029253	24.28167158	37.87401854	14.45938465
76	35.12796203	65.84857394	85.05948567	62.50354974	62.27089269	112.5998495	200.2021945	164.1193339	50.05334944	77.65465537	30.59071493
77											
78	19.01558547	35.19751287	38.31824236	41.37716512	37.5445316	53.48425346	94.67535769	63.8526389	24.19927511	28.6524326	14.86052894
79	27.93987207	54.67457944	66.18085754	55.20142149	48.82168776	103.6859254	177.4122491	136.6898856	38.76952231	53.41748561	17.87995915
80	22.9364852	53.06454974	61.81772058	47.52872731	47.70081385	95.29229582	159.4101779	115.6529223	35.82810369	59.22601006	18.44219017
81	19.7960215	37.654947	46.54438757	41.66638515	38.15572203	74.38977305	132.0297892	100.6525421	29.86073489	38.29241661	17.58784276
82	20.76670941	49.93475943	61.08241078	46.81453986	49.79699836	92.17400866	145.3179152	113.7559182	34.07875798	54.85732419	15.41073162
83				44.86862892	51.41391582	84.11700754	150.5879109	117.056117	35.08569833	53.96970769	20.89593839
84	24.58024881	48.98545704	54.36818456	44.38250765	44.76114791	88.09872837	140.3775515	105.5339308	28.55363637	51.4739635	16.17471727
85	23.056325	50.40765663	57.64168428	46.48797719	50.25201313	85.26335095	147.7434981	116.4639444	33.07666671	57.61527077	16.8239657
86	26.59543947	59.99008991	63.48142014	58.79194332	50.3224744	88.65484724	167.3764254	125.6305961	34.38689449	54.26720868	18.41802304
87	22.87391433	52.00724407	60.62146157	50.58616835	45.75197538	86.75303369	160.7414421	118.3294009	37.19155395	50.84883282	17.49193912
88	19.91672894	54.81439551	71.95698435	51.91633918	48.63280203	89.84799443	162.2335937	118.2778879	35.06862593	62.75284775	18.36020913
89	22.35397973	46.58481742	57.25849204	45.32119229	41.99891586	76.63295333	128.8918135	91.77870239	31.48693206	43.74225977	16.87405301
90	26.00856052	55.09538723	69.80142658	54.62156583	48.95765387	95.98647296	153.8736971	113.4747083	36.94478153	55.99230335	17.08682484
91	27.29633749	54.96403578	66.46009214	52.86857213	47.48279234	89.52447522	173.6150498	137.1546858	38.38304006	54.66834273	19.13615177
92	23.2540323	54.90098841	62.02742498	52.1795803	50.07029472	93.29853459	156.2005566	119.8030532	37.21734292	51.40547144	17.67260407
93	24.74756261	62.33133745	69.79088795	54.61422012	56.2733476	96.26113316	177.9361159	131.2341298	39.26939176	60.13874155	19.01239097

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
94	20.96382997	46.31651208	50.02874681	46.84698854	44.61512157	69.47641132	119.0429593	80.01630898	29.34317735	37.44124242	17.74392591
95	16.82192037	40.24879361	47.82465782	36.00273424	39.99166122	68.93399795	112.4976548	78.48273865	24.88974801	42.18229738	15.98628152
96	19.83461551	48.80879767	62.12635395	41.31486363	44.63746648	92.78183076	154.1088069	119.9239678	34.37985169	60.31288421	16.68848148
97	19.25442713	41.94865729	66.09866377	43.71826633	44.71296162	90.54243818	159.5839012	126.1389516	30.86527383	62.34599895	16.45357622
98	22.89709969	41.41675864	55.98493672	42.42475738	42.25048887	82.66547137	143.5493984	111.0412368	31.33631458	49.9269362	17.06133834
99	21.12738897	52.36782889	58.96295886	48.91028422	42.92861148	91.43302944	158.6595439	126.1489874	35.38053755	52.26745681	19.05905888
100	26.09238043		69.06695828						35.70298856	65.80627319	20.64404646
101	20.81491661	43.97590289	61.68854013	39.74395691	45.81107568	91.49061663	149.2795153	108.4899139	32.03583789	58.01827792	19.68294153
102	25.288821	46.49514134	66.76625408	36.32374651	37.4454985	94.15027049	154.2113807	117.8630115	29.78379414	62.83771047	17.36209462
103	22.75407751	48.66551179	58.90968964	43.85242462	45.13333632	92.04855737	147.6693895	113.3727836	34.63512029	52.1937471	19.92410788
104	20.05845473	46.3250355	59.83049586	39.55560587	44.25082987	86.18105791	148.3370248	111.8877608	32.71193951	54.24306957	18.70370612
105	24.35022327	43.19627584	58.02952727	50.42587561	42.90752391	68.00583917	125.4266759	96.56665454	34.70238181	46.10722596	16.75980064
106	33.55491614	54.91229881	45.3329373	61.72341423	43.11120145	68.80331897			35.56279124	33.50425881	16.46028675
107	20.45717177		55.05610955							55.59429294	
108	35.12342985		60.04070164							58.93331441	16.06764427
109	21.76441345		52.72775225							45.14317717	
110	21.15641423		40.70296553						28.22028046	33.5293928	
111	25.11971996		55.57027366							50.99482544	18.5928749
112	24.35780503		57.88929194							51.07674516	18.92945047
113	25.25816826	42.50113655	61.86459505	45.89390897	45.2555724	73.92479083	143.972254	117.6733036	34.62256251	60.35329325	23.36521301
114	22.76294695	50.14674112	57.66664226	54.26163306	46.36198317	81.66228275	147.642716	104.089756	35.58490873	48.61368088	19.55356378
115	25.02348948		67.81696752						38.15963812	57.35435083	16.88013446
116	19.36475096	33.351696	48.04705465	38.48001435	32.02808937	67.40789202	118.4137394	84.93348265	27.49211477	41.13031375	15.45297787
117	20.38335206	45.98934077	60.66155739	41.68310529	43.95781191	90.23377928	141.9510291	108.4502499	33.54468797	59.36950643	19.36849054
118	20.93361564	42.36732711	55.84314758	41.11706603	41.05771985	84.03708645	143.5475897	107.7000099	33.15022358	49.06288867	19.05075934
119	25.9799252	52.2024805	68.7627232	48.41793403	48.87724316	87.95326423	141.5728981	111.7364664	37.34392309	64.86203524	19.23587517
120	21.08267086	47.51557201	52.93707396	43.21574475	40.96450372	85.40050927	138.8129735	104.7258348	30.93617337	49.93838626	21.18077747
121				40.54069034	42.33408354	88.25933187	158.9342898	119.6737987	33.06228908	61.94339271	21.98081093
122				48.80041758	50.52761358	102.6019505	162.4960248	129.9434459	36.21306098	67.91109958	20.07051584
123	21.7338986	54.93077566	60.49200661	44.35115936	48.10194644	98.12556332	153.4856899	113.8663608	30.79652311	55.27530273	19.06679334
124	20.83678238	55.77985006	72.42295484	49.12371211	51.76117385	106.4972057	174.3573493	138.2926009	38.6963779	68.40250737	17.98149809
125	17.52093233	56.26559224	59.58469121	48.64005209	56.01411957	92.55537336	160.2860471	126.8409811	37.31190457	57.65982317	21.88831904
126	22.67297274	55.08108628	68.6386177	52.00834067	49.55901352	82.15420295	160.8031971	120.1771268	39.01160635	58.81712526	21.59332051
127	24.26553781	38.35450038	53.45927118	40.68867603	43.61946274	73.37910548	143.2436845	112.2019329	31.95121723	46.88507865	19.87156582
128	22.55942334	53.74222564	63.14683696	47.14185932	49.13825053	90.4431826	165.031509	127.8037237	35.50057483	54.94613695	20.54719454
129	23.8859605	57.87972952	61.59542333	56.99593893	53.78144062	87.61528651	153.9855125	108.0293796	36.69125902	54.28601657	17.99252533
130	27.34727059	54.91752451	63.12453848	53.26546903	45.28679335	91.96557921	153.91684	107.4900477	33.10685492	56.80695334	17.37909371
131	23.61035334	47.74986643	60.66526755	42.5776236	44.06344512	85.21120007	142.5077043	105.2624035	32.74184466	58.45126088	17.03232605
132	21.6696204	40.56864918	63.54791387	38.56238877	44.30688366	78.35508421	140.0678135	105.1346189	34.88387353	61.49531338	17.18244131
133	23.35768427	41.09722506	53.38203845	39.6463415	42.96925119	79.30957303	132.1782116	105.6117325	31.8129824	43.68013848	16.74375279
134	27.79324304	51.72305414	56.44324952	57.14648465	45.16066295	79.70532601	148.8014494	104.1187502	35.12566226	55.15366861	19.77183385
135	21.40121679	52.10970634	66.7203979	47.20141698	47.69944072	94.05859227	161.3774521	119.8112665	36.68118487	60.69102456	18.13647251
136	18.6511779	29.99172241	41.65937373	30.94775239	32.28592625	59.33585615	99.60477783	67.33065739	21.24362411	34.23662517	16.16910818
137	16.64438018	35.49475539	42.17284842	38.74984495	40.50442555	59.493629	103.4469595	71.92792826	25.09086428	34.23031913	16.13129592
138	28.15106459		66.0722316						36.25207528	59.43091923	18.78037885
139	19.97154374	40.82168226	41.16770836	46.63014753	39.47227868	63.84949115	119.4677986	82.30512046	29.30909244	33.03501171	16.37472757
140	17.19129247	33.12838119	44.54165995	35.86334544	41.70083423	60.44237354	98.28744075	72.89113248	23.00050738	40.34601549	15.52442664

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
141	21.64116695	44.0774832	55.75706237	41.36472747	44.48805491	88.30945157	144.9605305	112.2974377	34.83341132	51.54587924	16.756201
142	21.07248311	53.69797085	71.37752504	43.06614839	42.31595478	100.2165894	173.2925738	127.8882333	36.80498429	66.17810434	17.87341066
143	25.7929315	47.13697226	63.01072941	43.11293861	52.84906603	81.51980244	155.0080558	125.2749002	35.14837745	56.70622836	17.88749964
144	21.25989418	52.70817988	59.18728418	48.99315708	52.71101448	96.35623696	152.2690631	120.6612977	35.05184667	54.76963133	
145	17.54033428	46.96542777	56.84966841	45.45759744	47.66091755	85.20390803	144.3954581	114.5568609	30.48436655	55.69935282	
146	21.401598	47.19442666	62.41574085	43.93741103	47.34154858	80.57176687	149.1498081	110.9589852	31.53684882	55.10944964	19.14501984
147	25.55570387	47.84266164	65.45187806	46.33837259	46.1574615	95.57947033	163.6185162	123.1326551	36.05408675	59.04072774	17.40549584
148	23.33224059	47.86281232	68.65220853	38.8822773		90.82807623				60.06227389	
149	23.66998433	54.54138592	66.29938064	49.63578891	49.02491157	109.9796548	159.9671076	125.1230923	35.22781105	63.16838462	18.40496481
150				53.20015165	49.64043143	81.24518001	160.7759276	124.3362674	38.07720542	58.99548482	17.48602791
151	17.94904058	67.26324553	62.84718169	54.82879576	55.82068678	94.13254067	172.7493271	133.5968522	40.41929764	61.94152456	20.68854463
152	25.46184694	55.44844071	66.52817718	46.38578867	49.35962345	99.20905593	160.6152563	122.7893398	35.05620133	62.25774307	16.99070815
153	21.89171358	49.30922839	61.89943681	47.23226898	47.55148431	93.56327983	154.8065533	115.0015196	35.96703779	52.92603545	19.36974071
154	19.85476298	44.28382705	65.61634818	39.52592432	46.56476027	86.06596936	154.6183274	122.0128756	35.00488839	58.85338519	22.15089195
155	21.02345583	45.90636868	62.71213496	39.80372388	51.86736141	81.77133481	133.0748844	99.42033059	31.52432464	55.35812517	17.68456462
156	21.35132473	52.42935289	64.41023667	43.49901889	49.72971773	85.92714237	165.437931	133.1109493	35.26083482	50.9748963	18.95528894
157	21.08141274	50.92982016	62.42099298	45.02242709	48.26481894	83.24898059	148.5985561	117.4730011	40.28343858	50.85685708	21.41770245
158	25.52805866	54.6817552	62.4758732	46.11519762	48.89969115	91.71713308	153.0014049	121.2709067	33.22053035	52.55442635	17.14997724
159	24.48629653	50.92343855	65.63609249	43.41564051	42.19893598	87.3922498	154.4740162	117.4664761	32.75325249	58.46304184	20.77510355
160	25.228289	58.28684615	73.31227862	52.44654501	50.23726626	102.2479779	168.4954876	126.1062112	35.08283989	65.57621795	
161	21.61371394	55.35030984	64.54352996	55.50048405	50.04696983	92.78596951	157.4152096	124.6125334	38.73451119	51.75035657	20.17247753
162	23.09400471	57.18814757	63.52377071	52.97383623	49.88703536	97.73490402	159.3522676	117.254097	38.64942505	50.33857079	19.57050314
163	21.76871173	52.3394328	63.52061208	47.89653383	49.22704643	96.95729049	149.9288219	116.5341534	35.7117671	58.36294093	18.2077722
164	25.07962766	50.93236617	70.7305766	43.01544169	48.72670135	96.08516666	174.9742266	134.0147514	38.06272391	63.1255583	
165	23.20185761	62.70717584	64.92875999	52.20671205	49.14751033	97.18621385	172.9037414	129.4610469	38.7477539	56.4999157	18.87230397
166	22.94685697	54.06636778	63.68308843	48.42984499	50.98168775	89.21291437	160.1098422	130.0078408	36.75962636	53.4899818	
167	21.77148003	58.03615844	66.10053637	52.89524074	50.19987999	94.011716	162.0621815	123.2736201	35.19800694	54.23314776	20.02467214
168	13.62529815	55.41867257	53.5230911	48.63526814	50.31308017	91.92011912	154.2992267		37.84989881	58.02332421	20.98286149
169	25.23757876	40.03030249	60.08860166	36.48060371	39.21952814	86.71017562	148.5699008	110.7556544	28.47746226	54.38000876	16.97977258
170	21.20399017	49.95720782	70.11058534	47.98378089	51.95394659	83.55734904	159.3246027	122.9280123	40.50393323	62.40169597	17.34642262
171	20.72859551	58.46423095	63.44625346	49.66261757	55.29248645	88.82147674	162.5995146	126.5616963	38.97630468	56.40645657	15.68706376
172	22.5485671	53.12024508	62.78593241	46.78885634	48.64271122	88.48063754	165.9624354	125.0894322	35.59340351	55.88420555	20.37664798
173	20.53499262	45.35532919	48.54892071	44.61898472	44.17090509	79.91958468	135.3768866	102.3743251	29.14781913	40.88686554	19.58259843
174	24.47696047	53.31219642	62.41166803	48.22032652	49.93858864	89.19377666	136.7178393	109.855709	27.07059337	54.20198865	19.03664957
175	22.40183303		58.76737349						29.1561789	50.25060241	19.46416683
176	24.44535578	43.77532707	55.60588021	40.15275987	43.84835838	75.9868419	125.7463188	88.94406656	29.21435523	42.18076415	17.52503796
177	22.18736321	47.89703199	53.49295947	44.25757047	47.68320431	74.6327687	141.2280568	109.8254136	32.43120104	44.5886267	20.26773944
178	22.5997134	54.56711014	61.34297732	51.18353734	45.64129209	103.6026803	153.8451768	117.3159189	29.17990181	60.25052469	16.84222346
179	22.328942	46.62592474	68.33732595	38.26174366	51.8709033	75.04993073	127.3075518	100.5565475	31.6937082	61.31531947	19.15328606
180	23.09590745	52.56649761	55.7937857	52.23097983	50.29630823	89.53388422	143.7633795	110.0035675	28.41276119	48.89377391	20.78762647
181	25.26845603	42.77656578	54.9531725	46.30994282	41.58010811	71.96661839	134.6372186	103.1113505	28.08786214	49.86456034	17.06508743
182	25.68760932	41.71877707	63.87878032	44.89877907	44.06307992	90.60304736	148.4983149	109.121927	35.6191308	54.59821547	21.7159373
183	23.69162242	46.21169468	57.45025711	44.4736418	46.58070398	86.8894578	146.425449	108.9030987	28.36507248	55.59740317	19.24912984
184	30.73378961	53.99193919	66.37356556	54.94398294	44.97968349	91.28922271	140.0514486	101.6971149	33.78568276	56.57851019	15.92253139
185	19.25818276	43.79515737	56.10341023	41.25044	44.37783363	85.63271655	148.584706	112.1647487	26.41512213	58.45412103	17.65416202
186	20.26609257	43.66177176	55.51137391	42.43210958	45.42995014	74.29332947	143.5231379	103.1777875	28.08629838	53.92992099	19.46760959
187	21.57019312	51.75760695	59.60719568	56.05725928	43.33391242	73.49512273	146.1933661	112.9250944	33.33474987	57.04763396	18.33143192

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
188	19.13464422	45.38668091	56.62515276	44.69097449	45.55981691	75.50243783	151.3773597	119.1409838	32.61276043	45.97583068	16.91887069
189	14.62664228	47.13455645	50.56242382	44.98878884	46.24952439	87.38791138	139.8857339	111.6417561	23.61927642	51.06344426	18.83539358
190	23.15566282	43.40445393	48.45911569	46.7481182	39.92722834	63.93851918	120.4167943	79.70777528	28.70189712	35.6799387	17.44054757
191				51.2505902	42.43742224	71.08237065	136.0859487	97.75796572	31.91563304	57.43021037	15.57608342
192	28.11944156	60.20136963	59.30022344	64.2765941	57.42815342	70.89098285	152.0581775	106.351602	30.3351511	51.74816558	15.77304724
193	28.94191524	47.65425037	56.75606953	50.7386313	43.15543099	71.1122525	140.9027908	88.71614523	31.07153044	49.47941081	18.90304554
194	28.24503238	56.83981863	56.95851421	57.11900723	49.05106731	91.3366341	151.7045579	97.59642038	30.35879044	50.46701136	17.81390135
195	15.60563088	41.42557351	52.3830455	38.27588276	41.95402369	79.07091191	133.949176	93.98282304	33.44640004	50.7414436	17.53439024
196	19.42247932	41.18217297	61.37345246	39.81100941	39.22102065	79.93634711	147.9451648	111.8200583	29.37115809	57.86225328	13.38261394
197	19.9849595	56.50307112	65.37661221	52.9394946	52.90726029	90.70114127	161.4578571	126.5458499	39.4941281	56.77049045	19.48730281
198											
199	22.66703779	49.19848602	59.75865311	46.60804719	46.42688903	85.41412149	148.2729214	111.8645287	33.33554535	53.49949081	18.33014353
200	3.412457169	6.881391859	7.322690201	6.074201917	4.710690378	10.86041105	16.6388845	15.31744344	4.101332173	7.984990101	1.809158987
201	13.62529815	29.99172241	38.31824236	30.94775239	32.02808937	53.48425346	94.67535769	63.8526389	21.24362411	28.6524326	13.38261394
202	35.12342985	67.26324553	73.31227862	64.2765941	57.42815342	109.9796548	177.9361159	138.2926009	40.50393323	68.40250737	23.36521301
203											
204	20.67724473	34.20977433	52.55655433	38.28129363	42.32406755	71.55955271	118.8405013	88.79139191	31.51312247	46.92370199	16.26513914
205	22.99881951	46.52674943	54.99370143	47.35127059	45.2208979	77.21957155	133.434915	106.9239588	33.54849424	49.56422387	16.36320647
206	24.24777168	45.38888739	57.79609356	48.0009998	44.36501509	81.7460741	137.239224	98.05476694	31.08319712	47.80692438	17.74077276
207	24.81363718	44.64862136	51.56489667	44.92891396	41.86514215	79.75440221	137.5017478	98.46535441	29.50707832	43.92399054	16.64036505
208	22.9929151	44.22687492	45.99796908	48.61421441	43.45947464	70.71964117	130.0477461	91.39699597	31.17446757	40.00550865	15.21059097
209	25.11649467	46.34676585	58.50835444	45.51490713	48.7423935	79.61379869	145.5552446	115.5236568	34.63616236	53.25937471	20.37404946
210	20.37783945	44.51185676	58.33635127	45.67523496	45.53399209	81.23174476	140.7860156	114.2726945	30.83328185	51.99233006	17.06582729
211	22.99718997	45.5596353	61.86571688	45.89317233	47.30290361	75.36375533	147.5658801	119.5108365	35.14121807	54.89469681	19.90117049
212	23.70948678	51.00635781	54.52009469	54.21793968	47.0298319	89.34308198	150.6731604	114.5143252	29.25412703	50.36459381	15.8497547
213	20.92610954	41.22050423	57.37349952	43.81822594	47.51256426	79.05753533	138.645635	104.752351	26.91711342	55.06034294	16.54940479
214	19.80016734	56.00173111	58.20184367	55.77950797	49.74759964	79.6608125	133.0897501	97.1409592	26.9845272	59.75010563	17.37811827
215	19.6996158	44.22648285	53.08878135	44.20076986	47.43292173	72.35425362	135.3168046	103.6960608	32.36509968	46.02316807	16.20353471
216	22.88589673	39.93392499	53.94019858	38.41038108	43.48700964	77.17680324	134.9308308	104.6370555	30.63842775	48.8742441	17.54702255
217	17.82377758	39.75654835	57.96887688	40.97436302	45.43064237	81.65173428	144.3610937	112.3227865	31.99019266	54.90171447	15.54974623
218	20.95501824	38.37028949	52.30278388	41.96596648	43.29594702	76.43480924	133.0621656	107.3134657	28.92905601	46.276772	15.91497024
219	21.22875762	39.39879833	60.16396357	38.64697386	48.07176556	75.42992903	139.1284398	106.1049754	34.17178759	56.41099266	18.30888965
220	21.47667713	43.59938222	54.59192029	46.19105824	46.36515169	84.08309434	138.1193606	109.8400957	32.14929755	44.61144589	17.83684865
221	25.3390238	45.18477626	60.52395138	49.32927938	43.72706732	75.88182342	133.2090825	97.14439918	29.34237775	55.35286011	16.96689169
222	19.96588631	41.52669571	55.37819557	42.48525408	46.32531937	76.32111658	134.9746301	102.7807448	28.37879967	49.94638052	14.85141306
223	25.64450332	46.52003527	63.41194063	49.23516671	43.44651179	78.8917541	150.404236	114.7462169	34.1201118	54.79147226	14.39469725
224	27.23409385	52.05910837	57.86676019	54.89969955	48.70680356	77.88101752	147.6673503	116.6562334	36.1312189	52.7870743	15.9226337
225	21.66082827	50.13626168	64.87542066	45.40474738	53.03333384	90.0420853	154.5086988	126.3677819	32.50876388	60.62949137	14.86706305
226	21.85279553	37.49811313	53.92960774	43.37455734	48.29241603	74.4610603	128.4113763	103.51804	31.09875125	49.32422161	16.28751878
227	25.93061151	35.05798204	60.35020497	38.81464031	41.00473275	77.80402339	139.0837709	104.5769291	26.92024819	54.41162794	16.58336139
228	28.53247332	55.35582643	61.67725747	62.16799165	45.25764296	84.79348719	145.705319	100.4086302	35.25473981	54.53264274	15.81854802
229	18.22669083	38.92654432	54.27430675	40.40696637	43.79901692	83.28143674	144.7146138	112.4629592	24.51331018	51.58200407	15.93600219
230	21.23380278	40.90132356	51.67457919	42.76042315	48.94877038	78.36996597	133.1460189	108.5848217	31.89241311	43.62641506	17.27453691
231	20.82451178	41.72895778	63.23189107	40.10638117	47.91370794	84.59591111	148.0032356	123.2601172	29.85334416	58.39206958	17.67834639
232	22.02111938	36.58552512	52.68663062	39.86782566	44.86146348	77.35671772	137.5595583	110.1746704	28.20033799	46.98273673	16.20499247
233	19.67601504	42.14127364	59.64207562	41.8418011	45.23029287	81.45398237	153.2430907	121.1041709	32.73259617	51.96570183	17.34466479
234	20.46662076	39.42902373	57.75043895	38.03066055	45.7746901	81.52031734	139.1895785	108.2611954	29.93770287	53.28283074	15.86790964

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
235	19.62849869	39.3083526	61.35693829	41.09802446	45.94498167	77.77752157	145.7592709	114.7681584	28.65654606	57.63845378	17.59353073
236	22.78778262	46.35899257	56.46272553	45.62253117	49.15593051	83.83708131	143.9504015	113.5303114	30.81155234	51.57084303	16.95842997
237	26.15627724	53.61218064	58.99174728	60.12506023	44.93133564	82.25122009	143.9447895	99.0015415	37.9150871	53.39644858	19.02005436
238	30.12911099	52.22930276	55.60880911	60.56021242	43.25601006	76.07552369	144.5755858	100.5630761	36.33866273	45.36443762	17.32424038
239	21.98295763	46.41987695	58.15651182	47.66841875	42.37687774	80.8602461	140.2355156	105.4205449	31.93381459	55.35346605	18.1732702
240	21.58810758	50.96959917	58.16866156	51.61809611	46.99292133	73.20447192	137.7825046	102.8443684	30.62525441	52.58071516	17.81149382
241	26.03657887	45.1659371	69.51240147	48.20499163	49.95887759	104.2503586	166.0749379	139.6439964	34.6535744	64.44825509	18.28058476
242	22.031026	39.71125243	56.76112846	42.19418223	44.43983723	84.6753148	140.575498	109.8275387	31.42149068	49.99264096	15.6721949
243	24.05820283	46.79544017	63.60722996	46.27656947	46.45282605	78.63662844	153.6073808	121.4457934	33.82177512	56.62157166	18.1867621
244	19.9599724	39.01366536	54.67145971	38.27862002	41.35787635	81.93268808	132.577159	106.7077813	27.91681717	50.47079665	17.11313622
245	22.70177859	45.33724663	58.81629651	46.51936016	45.94464923	78.81315659	147.7544163	109.9863268	32.03491467	54.26929425	16.64774424
246	21.48952587	46.70296114	57.44017315	46.80914877	45.03129309	79.13562477	120.7313719	84.65144386	30.26939885	50.77705137	14.7286889
247	19.22108968	45.4398752	52.31697638	44.29735992	47.47832002	83.74187808	126.1917846	86.09678842	35.46931044	43.83283148	17.68654577
248	18.28757418	40.37365681	55.86119327	41.62350443	40.83056334	76.62057955	122.7210732	91.60966271	31.95748537	49.38292257	16.34763188
249	21.99832557	41.32073048	58.72246327	46.08542999	41.75397247	82.77276138	137.3599706	100.2513044	32.90424265	54.65783219	16.57863282
250	21.58963763	52.67693718	69.76321293	54.13088207	53.01170057	98.58430868	186.3709133	152.2678681	33.12445686	67.9480414	16.54692748
251	23.64429428	46.09984764	56.08710354	47.92881808	46.81469039	71.33214839	130.117023	97.82209538	29.30560112	46.55535945	17.40518579
252	17.59770973	41.3392189	52.83970437	39.63233387	46.36398576	76.84566284	134.0554392	105.0313866	26.16131015	52.14762398	17.45008816
253	22.05720802	45.20603719	54.07682704	49.30972861	43.55668204	78.31442515	134.775451	104.5770545	32.42406085	43.71440335	17.35401707
254	24.97931812	49.42911618	59.97385008	50.58981956	49.52715565	73.60777323	141.0148383	109.7596783	30.31476846	54.57018209	16.63512934
255	23.69764828	46.71482289	58.25039145	50.85697968	48.38788726	74.99659637	136.321826	106.0535151	32.60179421	50.50990001	19.21538165
256	20.79821539	37.49112457	50.22667524	40.47363905	45.45426722	79.18221665	134.3153763	99.54278759	29.14888006	42.06030772	17.17773036
257	26.60497724	48.03894525	58.07399783	46.9089445	46.82682489	69.98518497	143.917376	108.8703196	27.67284751	51.30764577	16.59631215
258	25.45413399	42.96749726	51.67614394	43.5994765	45.3153987	70.8106937	130.5387165	97.28056403	32.02003751	43.62397865	17.81611049
259	28.41145319	52.63740587	59.69550712	57.91095436	48.8579383	76.77993146	149.0439446	103.273045	31.9991977	53.79906552	15.81465283
260	27.88365964	53.39590919	62.46730766	58.11599087	45.48834094	83.28708254	141.4578477	88.88260503	32.60405692	56.2285477	17.61603672
261	28.54085693	53.93667144	71.06710756	51.84323171	50.87007937	97.22699237	175.1912766	140.6286133	33.47886103	66.74972204	17.22373615
262	28.80876658	57.7739231	67.52139347	63.19232016	54.40244168	89.78221482	159.3900031	112.9291297	29.27604651	61.04795885	17.69183929
263	15.07354497	33.96138489	45.99052396	39.00634065	37.02861522	65.81059812	109.8093377	80.36197193	25.41491755	39.34833738	15.01254878
264	20.37268155	40.88824036	51.52969076	40.8079859	42.34683807	71.47448923	127.4295386	93.592222	29.91452742	47.19149312	15.23948321
265	22.68978083	43.71089706	60.46246066	42.64153422	43.52972323	80.6514891	151.1954553	115.5543131	31.37154887	54.83219752	16.87851781
266	23.91061503	54.51760074	56.77801671	55.39233417	47.22677932	86.87326543	146.6640969	116.1859025	31.56017641	48.27928256	20.15055324
267	24.77803824	44.07858982	57.93846626	44.18622794	44.82686215	78.42312709	138.1823609	105.2318759	33.01008513	49.07657214	17.77913061
268	28.76393441	49.98556412	55.73473301	56.63950669	48.79184517	77.73192875	134.9373382	82.15289087	31.85024671	45.22057195	
269											
270	22.84691813	44.94759131	57.50234908	46.72829455	45.96989874	79.71293042	140.5644445	106.917771	31.2569956	51.58185248	16.94412989
271	3.148403673	5.659121402	4.952564544	6.467948098	3.100903046	6.615125999	12.02426887	12.90179381	2.710336443	5.884292245	1.259163701
272	15.07354497	33.96138489	45.99052396	38.03066055	37.02861522	65.81059812	109.8093377	80.36197193	24.51331018	39.34833738	14.39469725
273	30.12911099	57.7739231	71.06710756	63.19232016	54.40244168	104.2503586	186.3709133	152.2678681	37.9150871	67.9480414	20.37404946
274											
275	17.58080536		46.38724273						30.05975595	42.33062714	12.31096131
276	21.00004711	39.04545218	57.46320018	38.29697715	40.90169983	89.17206088	145.8664822	113.5070124	31.51273069	53.65062483	17.72445819
277	13.31647395	30.58705332	37.59769654	33.90000006	34.18112243	58.79762041	95.52023756	74.45854687	20.51682837	36.97723868	13.7591644
278	23.28726892	38.61320729	60.34916697	39.50944354	47.24924109	88.44532306	149.9200017	120.7856794	34.77012719	49.43893716	18.57420746
279	21.55905261	40.67076898	54.41289652	40.10492883	43.3112591	85.00863484	137.4108973	107.0994781	30.59529317	46.05360422	14.67266973
280	18.39620601	32.54594143	54.30612405	36.9432024	40.68050566	80.75218943	130.4018136	89.06814125	30.74415294	49.22314207	17.31338036
281	25.07377965	45.64580481	58.54182133	46.55436406	43.67979874	85.52890456	150.171761	111.2727015	32.78405449	54.86156682	16.95108681

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
282	21.52476789	38.95060923	58.06468572	40.52755084	41.64317227	74.00765355	129.7025541	98.21177803	30.65847894	52.40227096	16.82587086
283	24.33983323	43.72434339	57.52095512	50.55644665	46.83144737	76.32484462	127.678092	98.99220125	33.41756166	49.54220887	18.06905966
284	24.23621477	39.27327407	51.17761663	47.22731484	42.77023302	81.25026742	137.007195	101.6211267	28.98045109	46.81463959	17.41341206
285	20.45857199	52.30504829	60.62113599	49.03666563	45.93121371	90.08150054	143.6927362	107.3037128	31.7464673	57.6304401	18.30564363
286	24.29029153	45.99937835	60.15744711	49.53938905	48.37959493	70.70439749	141.7747296	111.3106423	30.14029866	50.23912495	19.76786599
287	26.38419145	46.50643994	68.9147715	48.12125317	43.14131592	90.93467684	152.8256379	117.230873	31.01023929	62.75786431	17.210318
288	16.1893622	38.95596905	56.84923075	38.83036997	44.53439988	73.07476664	138.4364023	106.6314859	29.64638336	52.81943289	17.27974015
289	21.29886148	41.10039376	46.81167653	38.99692632	44.11228827	78.85544586	139.0783924	114.368028	29.69964927	42.58499185	17.26203161
290	25.43143305	49.6594226	63.77741557	50.03107093	54.14227818	87.31844181	146.5767063	113.9559187	31.13839179	63.31544396	16.78867893
291	23.45277233	39.57324976	64.1927274	38.72547539	43.81407653	84.1490029	153.8332996	121.0248999	31.03993181	53.20444016	19.35939873
292	19.21499924	44.62469538	58.90520754	44.00818946	51.01928517	80.31315345	132.3857176	106.1163189	30.54876226	52.76764614	17.41933985
293	22.44896509	40.88640718	50.63158545	40.74585223	49.12814347	67.43238172	134.0738933	106.3856017	29.13188971	43.96761983	18.24878326
294	24.18921459	40.04433004	57.30760891	39.71559592	45.01585794	83.3840037	131.3046513	103.2607524	27.93987342	53.02465413	16.20538196
295	31.86835736	58.74311845	70.90443429	62.85240604	46.3867937	80.88773528	158.9616239	116.2277314	32.57610727	63.56609937	16.91440912
296	22.75180021	39.59752053	67.35529791	41.82583404	46.85163266	81.21987121	143.462655	114.7434265	34.0542625	58.79230017	16.2667797
297	22.80970718	46.42187127	60.32033645	46.32413734	49.07409092	86.53432771	151.3585429	120.7813921	33.07630768	54.35060329	16.16355013
298	17.78128144	42.23966334	57.7372251	42.98614147	45.94055136	80.534768	142.6833164	103.7105885	30.07163402	53.29535449	15.69661514
299	17.05072032	34.2451448	43.33590233	36.45605335	41.07741578	59.80209795	111.2561366	85.83847659	21.96225431	39.24768423	13.84713227
300	21.70985952	44.66902589	53.72602926	45.67375262	50.36653582	67.71154389	130.6411837	102.3720558	32.68901607	42.66002433	17.64041603
301	20.74820079	44.13582274	61.08721327	44.44504503	46.26057345	77.57790229	139.3964697	109.7532507	31.10963208	58.80228461	15.6403975
302	24.44839297	51.8057166	58.93099811	48.61297429	50.20109285	88.62570899	151.1499307	113.18546	27.69347417	57.33407593	14.36598122
303	24.40043821	48.89524777	48.29897461	49.26826583	51.73464867	68.06094085	124.2031682	84.64609383	28.79450493	42.98893642	17.78219522
304	23.13953845	45.73864273	57.06310729	47.6616399	46.23386663	83.53259148	140.3359594	109.9738581	29.27642348	50.72588774	15.52887772
305	22.17210234	37.90284609	53.37466873	40.88954784	45.53097956	79.15688364	137.1699494	103.726207	26.6388047	51.23513742	16.07224203
306	20.83531275	47.55054191	46.9988655	51.64336669	46.3000576	83.95742794	139.5032777	109.4284993	31.61411894	41.28594552	17.63336886
307	18.96115687	46.79579448	58.57090357	47.48098779	51.89374069	88.59349094	145.6940377	113.8889903	30.69152702	54.37145484	15.96875332
308	23.00254342	37.37725178	62.98576934	38.91633946	44.49955746	88.80824186	142.0430042	111.4443707	32.90244824	58.58163708	15.83557215
309	23.72224382	43.22477734	66.76209265	40.96353957	52.2228325	73.01402061	137.6403336	107.0610001	37.47562041	58.31662529	20.05311536
310	21.29007296	41.52402759	53.40206895	48.53051778	44.24484792	77.69165459	134.1999477	105.7893773	32.43128184	47.97610316	15.92691194
311	24.45813545	43.84076381	58.0402726	48.76610775	44.74973181	82.31226386	142.8935465	111.2796611	30.51515793	51.25345495	16.49251155
312	22.47394895	44.74257296	59.19372416	44.00985836	47.99315242	71.14520622	149.7828953	123.9885642	33.19163457	57.79833098	20.02994168
313	21.72436635	43.61934975	52.64032818	37.8669386	44.69899511	92.62323807	140.7439071	112.3649235	31.87068155	45.50408893	19.36453503
314	24.08936645	49.14737714	69.29689167	49.03995943	49.99010852	100.3357294	158.9526892	131.9681267	27.70492041	67.00300457	17.32653078
315	24.47773163	53.94821992	54.16708768	54.83806321	50.14041553	75.8230806	134.6649833	104.3046406	33.86217356	45.28695615	16.7876715
316	26.01673652	62.98755124	57.58400287	68.62858126	52.02807498	83.26107752	146.0234966	101.9707669	39.0433058	47.13421382	17.18308991
317	25.9748331	50.26383762	62.2094105	53.65098615	46.51702823	91.46091665	160.1884675	118.8527037	37.05486763	57.69915668	16.56128384
318	23.17024382	41.93804006	71.59615192	43.5210833	48.63497499	79.26532307	155.6332522	119.0952355	34.25685004	67.95254606	17.27051722
319	24.22110342	42.78021616	66.41482034	42.9056158	47.11486593	86.8453343	146.4652547	114.9657211	31.78807721	63.98038119	16.62187152
320	23.41819081	36.8317668	59.57318954	37.45542616	40.83134219	88.0547388	144.4677377	120.7225669	31.54839787	52.86919102	18.13701164
321	24.59617243	39.41132141	57.7493806	39.59550329	45.65631752	73.84545727	129.2226999	101.1090635	26.2104772	50.94089266	16.07903389
322	24.91173217	45.04183756	49.69862306	53.03125738	37.12183779	58.13849945	111.4835083	66.30596695	27.10186015	42.57853385	16.38412584
323	29.62955442	49.48189106	59.7706893	58.81558251	41.92822853	72.30298158	137.7529657	99.01430958	32.10766669	50.89794626	15.40376043
324	29.13441899	56.19080613	63.57416781	61.60990947	48.93305885	87.92992966	161.632127	115.4044816	34.85219316	59.75825215	17.08812513
325	27.35999942	45.27125767	52.15227551	57.49674035	40.58293335	75.91796018	132.2696123	89.71766307	37.70276455	44.96398376	16.62689416
326	30.13254303	50.33261073	59.52982667	57.6545984	41.90691325	79.99716218	151.3450126	111.5451239	29.97777326	53.94499814	19.38066611
327	28.26301887	50.77432192	57.28433261	62.00472347	45.13657645	75.18867166	137.414528	92.07524029	38.47597415	46.71597388	15.01915754
328	19.80197133	49.59262947	59.86035786	52.91933434	45.49890891	85.68074178	145.8103712	118.3098785	36.86944635	51.84841502	16.02143345

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
329	27.13149226	48.86979932	68.98734031	49.71794644	43.40661803	81.3938369	156.2934686	121.0616683	31.83157006	63.8472112	17.24784764
330	20.83953911	48.84310265	61.3122069	51.5755604	50.138901	77.17683136	137.0392608	100.5240051	29.61293793	56.34675866	14.89627538
331	21.93519915	39.96967308	61.73996155	37.75023742	45.32466567	80.16458225	144.9340424	118.1795465	32.22451663	53.81444951	18.31908979
332	22.91605765	42.36380185	62.73628296	46.73838629	40.58948982	78.63253657	144.8201261	111.0600321	32.64208357	56.9230601	17.44800409
333	18.20731852	46.71134873	67.58257953	46.62663258	48.72137824	89.6096583	158.8782481	129.3682743	35.20817491	61.4319052	19.64658875
334	26.72045106	45.8702276	58.91869736	41.40777809	48.66736321	81.42242734	144.6668145	112.5864942	34.81423274	51.52011706	18.62667159
335	20.68680146	41.33237719	59.37187257	40.30195364	46.11727897	68.54234255	127.2257889	94.26824337	34.49206275	55.58715099	17.62628406
336	25.8818224	46.28756751	61.18773322	47.98592826	45.26319656	76.27192115	148.0787249	116.6990635	30.14121017	55.43121352	13.46409237
337	23.50027752	45.00102592	62.95375438	44.4162568	44.37027336	83.74541068	151.056041	116.3588555	31.24111336	55.82651892	16.64130064
338	25.48403284	53.32029144	56.36466609	62.84936494	53.91284924	79.20032407	135.3285689	82.63194062	31.74162476	44.37978086	14.56007569
339	23.94499944	57.0635912	51.95318804	62.51829006	53.58842683	78.67664433	151.2903079	99.60107157	36.17075743	41.93258158	
340	20.48135663	43.08255926	59.56766072	44.27608123	46.12596959	90.69246148	148.0946242	121.8031418	35.70062249	52.40860163	16.23111872
341	27.50078056	49.90220349	57.41008781	54.04712674	49.77998463	80.2789908	146.1403865	90.35558452	27.843083	51.04268702	18.86674466
342	19.48761598	46.03962286	52.82403972	40.06694121	37.26846476	79.75666654	142.1940066	110.2166161	31.04899588	49.38587042	19.72043383
343	21.58868048	46.35867092	57.28024884	46.46266197	42.34877873	80.8636737	141.8533666	107.9013695	29.60628365	54.24275259	16.6093305
344	22.97852893		46.82273865						33.20011708	39.73067914	16.69741486
345	19.31745172	39.55455479	56.85841978	41.52168348	44.99881271	79.94819091	135.3950276	104.8007103	28.50824232	55.6396954	17.08862098
346	21.36114661	44.37278461	53.51384838	43.87014756	51.82067027	78.16221912	141.2724445	111.6616059	30.54581022	48.30185933	17.8042012
347	20.70080267	43.17485656	41.74108274	44.60108717	35.77624608	72.76890357	115.9370592	80.82666891	23.48301314	39.38320171	15.23244548
348	22.47880391	46.58317697	51.19890382	49.51781191	43.81396026	74.46023311	133.0535289	98.15793088	28.52059717	44.81086062	19.23131096
349	23.99676592	56.1859017	50.53363477	53.14308005	53.27554193	77.55596646	135.7799169	102.5871203	24.24870142	37.9595562	17.70463659
350	23.81420958	43.25498382	65.35213147	44.18952601	48.25001342	78.9093043	148.3544878	113.9871456	29.33508442	59.82884296	15.68121786
351	14.61906515	42.79048912	48.21727626	42.40504904	40.65956697	73.60435913	129.2559576	95.22515499	26.37711455	37.88410246	18.01993709
352	22.30026878	43.32291658	55.52211998	45.60194964	50.78577626	64.95869528	131.8250362	97.75772594	36.21501582	50.45571969	16.74852514
353											
354	22.84733816	44.94777238	57.50166806	46.72767521	45.97044529	79.71274959	140.5641451	106.9182932	31.25674265	51.58182268	16.9440013
355	3.352121046	5.842615593	6.729302363	7.344307047	4.2585754	7.955321973	11.6212574	12.22755751	3.514874051	7.22512737	1.576633165
356	13.31647395	30.58705332	37.59769654	33.90000006	34.18112243	58.13849945	95.52023756	66.30596695	20.51682837	36.97723868	12.31096131
357	31.86835736	62.98755124	71.59615192	68.62858126	54.14227818	100.3357294	161.632127	131.9681267	39.0433058	67.95254606	20.05311536
358											
359	16.06328408	36.27740934	37.34637046	39.8537895	38.94782087	58.74069514		68.36612288	22.63369036	27.62320196	13.75817745
360	15.21724138	27.09557672	35.17069678	33.00702289	35.07074406	56.54308158	85.13303168	54.85394641	21.41624933	21.76097093	14.14552246
361	16.93718134	31.67865774	35.49045722	40.99714911	37.83703627	52.23624768	96.68157255	63.0982351	21.7985796	21.3622507	14.86045595
362	14.99140689	31.55729034	37.15751985	38.58179376	35.72827793	52.38637823	90.17070856	57.38634878	24.23040162	24.8433603	
363	15.0173201	42.50635782	41.42524306	44.78403004	45.78273598	68.81364173	105.2734694	71.28071837	26.89264228	28.56210563	15.24919318
364	15.60880615	28.24722387	38.02221088	36.01684685	34.49163429	59.5301837	92.94681371	57.83237566	22.90620149	23.12460474	
365	13.35344308		31.5837686						17.63537422	23.31082078	14.19946628
366	10.51772545	21.86398462	34.2395024	29.13586522	33.45580145	50.02118621	80.99695811	55.25089973	22.42928064	25.05401138	
367	11.73567095	33.56271154	44.58509166	37.92931899	41.98075183	58.69745425	116.5212415	82.03969792	27.25604629	35.96129736	
368	17.7090201	31.5051959	42.87001869	33.24249469	38.45470822	58.88066223	103.3766262	68.45348029	24.26442777	31.91576667	
369				35.69408799	34.73744212	51.69039712	87.30272584	58.48995674	23.12442406	22.90114079	12.64998041
370	15.03396111	31.22173166	37.17920014	37.35999782	34.88590893	53.68288143		58.70342	21.05923875	25.89087191	
371	16.44705362	34.1403527	34.75948914	40.80056459	35.08086754	51.22328878	100.3743922	58.76150427	22.58240692	18.77359035	13.9562861
372	15.31637616	28.69677604	39.74136986	35.73370533	34.70442374	53.40888632	99.41295075	59.58711648	21.48670123	29.99305942	17.10175188
373				42.01510286	39.93260988	55.23832001	93.34051048	62.50289162	22.4128673	27.34120344	
374	16.05629374	28.59890255	39.56833188	34.27676309	34.91364638	51.26098416	104.9380333	71.39550847	24.83016175	27.57815444	13.66556886
375	18.02532736		39.90590983						20.88973969	29.59499127	15.21016556

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
376	15.75581174	33.68820499	35.95481423	39.28086237	36.30400251	63.48062144		57.17826531	23.11821041	23.7547299	12.94140227
377	15.60822733	36.61124668	36.77673855	42.12870858	36.49921791	53.41015725	96.77684342	62.2884904	21.56930731	24.72604377	13.74750612
378	17.64882212	31.49620003	33.33074915	39.46056512	32.93057771	53.89380747	102.5810505	62.4034905	22.43668638	21.04881821	14.96711163
379	17.64984476	33.1211359	44.42492888	36.65212362	38.45651993	59.92394321		68.31185804	25.94004554	26.18901311	
380	17.84127676	38.54500536		46.57303817	46.47685703	62.89355898	104.7547412	75.37342495	29.28391709		15.33468993
381	17.35433388	41.1559474	37.34637046	45.5552311	47.06105785	62.10835654	109.0427889	72.39612152	30.60646938	35.88166777	17.8745782
382	15.39693206	31.12198988	39.80414328	37.78300737	39.93285566	55.85585407	94.99056702	65.13317052	24.67461842	28.92421462	15.79314776
383	12.72392345	31.39599413	34.54633574	37.24922801	36.13020044	52.12647793	95.07816896	58.72958908	24.93357873	20.31266482	12.66824259
384	12.30436872	34.46908549	39.17022434	42.05140275	43.95660432	63.49687821	106.0920354	71.39900201	28.66487755	30.97255281	12.88996913
385	16.1994837	38.25339721	45.63781961	44.94607803	42.70833911	60.49948861			27.15518441	27.52223316	
386											
387	15.46052544	32.90479904	38.16822103	38.84435111	38.25842568	56.80173729	98.28926148	64.21731813	23.93449365	26.34320539	14.50073421
388	1.998933524	4.671031321	3.690521723	4.273025004	4.21031175	4.925491618	8.679822714	7.149095119	2.93952995	4.424324777	1.456493041
389	10.51772545	21.86398462	31.5837686	29.13586522	32.93057771	50.02118621	80.99695811	54.85394641	17.63537422	18.77359035	12.64998041
390	18.02532736	42.50635782	45.63781961	46.57303817	47.06105785	68.81364173	116.5212415	82.03969792	30.60646938	35.96129736	17.8745782
391											
392	12.89785435	37.66031313	30.62192491	41.98456438	38.92699192	50.97110867	105.8200251	72.90745152	22.52503086	36.007766	14.03185535
393						54.01721925					
394	13.7178838		41.29410978								
395				46.08328313	49.14181734	55.97756559	95.48422817	62.23411636	23.94007556	38.92386092	14.47763004
396	15.92943337	28.97667099	40.42192785	36.15964547	35.46117057	55.12086368	90.22462218	67.16047188	26.13163025	31.01420468	
397	13.80899753		38.5287282						21.28114397	36.64901497	14.55951683
398	17.35822189	26.50909588	35.76939192	32.53484351	35.68028311	51.43636856	84.64357625	49.77018205	23.82704735	31.32842797	14.24795845
399	17.76643561	38.31323629	41.63714925	44.41635066	38.76713324	60.63660357	103.8455252	58.22948219	24.97489095	34.36543192	13.92771734
400	16.31916105	36.01630092	42.47593952	41.16396765	38.46955311	64.1999538	106.0831417	69.34841313	27.98422	34.32410589	17.10615906
401	18.31429847	32.72465743	39.81987872	37.74166997	38.10002389	57.39285319	97.51223193	65.65256267	26.42528454	32.57646006	13.87624539
402				39.82667583	39.3693548	63.49390257	97.53804017	58.49004931	19.0958313	33.07482507	12.88551651
403	13.32424473	27.77148931	34.92404608	33.97944555	32.0349149	52.61491808	91.70694965	57.55106989	19.37200574	26.98334237	14.89789016
404	16.51849815	31.66094273	38.40838948	34.42637213	34.49184282	54.95951117	101.6605628	72.30424121	24.91236209	34.13445887	17.19829362
405	14.12004253	36.513187	41.48733157	38.96248134	40.39004781	60.79761501	106.6595822	72.7442305	26.73676172	34.71704109	12.30476365
406											
407	15.46137013	32.9050993	38.67171066	38.84357269	38.25755759	56.80154026	98.28895321	64.21747916	23.93385703	33.67491165	14.50123149
408	1.945022863	4.45580691	3.602908661	4.371373544	4.386254671	4.527754199	7.303172308	7.592250506	2.869755482	3.059465247	1.505326451
409	12.89785435	26.50909588	30.62192491	32.53484351	32.0349149	50.97110867	84.64357625	49.77018205	19.0958313	26.98334237	12.30476365
410	18.31429847	38.31323629	42.47593952	46.08328313	49.14181734	64.1999538	106.6595822	72.90745152	27.98422	38.92386092	17.19829362
411											
412	18.91976659	39.51948183	51.63233213	38.08562313	40.11159252	70.03410825	137.5594081	88.82327835	29.98546697	44.52840544	16.95160828
413											
414	18.91976659	39.51948183	51.63233213	38.08562313	40.11159252	70.03410825	137.5594081	88.82327835	29.98546697	44.52840544	16.95160828
415											
416	18.91976659	39.51948183	51.63233213	38.08562313	40.11159252	70.03410825	137.5594081	88.82327835	29.98546697	44.52840544	16.95160828
417	18.91976659	39.51948183	51.63233213	38.08562313	40.11159252	70.03410825	137.5594081	88.82327835	29.98546697	44.52840544	16.95160828
418											
419	11.57540221	29.9709314	37.7348389	31.52568095	32.62407106	54.98066786	103.6220623	80.87025201	23.17104023	36.5246573	15.65783064
420	18.52962842	34.91697583	49.67669325	36.11707836	38.93017136	64.09761409	114.3641578	86.4620861	30.07013114	37.72530832	17.12628082
421	15.05770587	33.83623168	45.2915462	35.85295153	39.01602196	70.289908	117.7843433	83.99014918	25.4876933	42.04723619	16.22217933
422	15.33046775	30.64194757	38.41911262	32.74575205	33.96448784	53.54551288	87.14812083	54.35879028	21.68645525	28.62324026	16.91734554

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
423	15.59785047	30.2813448	45.605901	31.93367807	36.27145275	65.80900162	107.7796438	77.16064282	29.032323	36.95294035	14.62007261
424	15.03609093	39.54006147	53.50535302	36.70899881	39.87145459	65.10457739	119.2902216	86.44685707	27.59375794	46.69154955	16.21520601
425	22.4371352	45.04248788	50.85018843	42.51515901	43.68714641	73.33380085	122.5947487	91.9487221	27.43965291	46.89589066	16.61871777
426	17.60571069	43.10480196	55.15064859	38.76543149	38.18110582	79.99449714	138.9131135	107.4258122	29.28637058	52.43718962	16.45520188
427	20.1122642	52.67844289	58.72338837	40.76609511		79.86090536	144.3222012	102.2548145		51.18864091	19.1758921
428	16.74586617	49.83596267	58.21357714	43.39647372	44.08795941	69.96203184	140.5409641	105.2255998	31.48527592	51.581641	17.26533242
429	21.00035673	39.99488603	57.62779761	39.93319346	38.20189538	76.06250178	133.8921431	103.183823	31.58562391	53.11381342	17.54843765
430	20.65645064	33.76713533	47.07440303	36.5160124	38.57100415	67.72235263	109.7267736	80.28588595	27.31973395	41.74034608	14.92649372
431	16.30857567	38.93792593	54.23446358	38.35735359	38.44144139	75.55620577	129.8930201	99.93485962	31.34810176	47.00189093	17.65708612
432	21.31395829	38.09773901	50.32975357	38.37842842	39.70577547	72.71409396	127.220199	94.34478016	32.40409085	43.58887543	16.12232286
433	23.1497384	41.51105745	53.65761743	40.32017095	41.2697398	70.82610786	115.883891	82.94025846	31.69986165	41.19959677	17.73166506
434	21.55992996	39.2246578	54.48582754	37.39501692	40.41165031	78.44131175	125.383203	95.4897893	29.48623129	49.73287888	15.43294399
435	22.31038991	38.87823742	58.23498985	35.5027215	40.70844177	74.08504018	125.0530288	88.00840777	32.04351804	51.83127545	16.74246467
436	18.60136472	41.12882345	55.43149659	38.84779565	46.3381375	71.60914781	115.791498	85.50291394	32.0705958	52.00899462	19.49874786
437	24.21973402	41.65490971	56.34042963	39.14586862	43.17671043	74.39882326	120.3349871	90.19413292	31.72493121	46.10410245	16.60855607
438	21.20852553	35.46298317	54.02239977	39.90856838	40.11668914	70.99264848	119.2320731	86.24641726	36.04973393	41.08801003	19.16679186
439	18.46768735	42.77716309	50.99206912	38.83844334	40.45778288	71.20874278	122.8908137	90.91237113	29.46188676	44.65958531	17.34087081
440	19.7906721	50.83916619	56.1334328	44.86953296	47.83348025	71.33229204	128.1757743	98.15027971	31.73789037	46.74881427	14.91268223
441	17.39367623	36.09066146	43.98540793	37.72995295	37.98193826	65.80594508	107.4824073	74.64474477	27.16503005	33.80873884	17.73831651
442	22.09418605	39.53862959	51.98365279	37.72854921	41.39557029	66.06574288	126.6414756	89.9782606	35.29909528	43.3043027	16.88307032
443	20.04677098	38.49787913	56.03785262	38.41292781	40.47766493	74.52459391	126.4431651	97.72049837	33.64924753	52.99788085	18.68135426
444	12.10927954	41.18169373	48.61400563	37.89913919	38.39842309	72.97746905	135.5007959	93.08840664	31.65538497	44.79765391	18.12889339
445	22.58982911	39.5902051	51.70785928	38.86115215	43.50721896	66.706923	110.49645	84.47726965	31.55220282	41.94539968	
446				37.4395616	39.40055808	62.94478048	111.5452105	75.80297781	28.09603369	40.44387398	16.29775077
447											
448	18.92034249	39.51936821	51.63202616	38.08613172	40.1121479	70.03404428	120.9980888	88.82320725	29.98525534	44.52801171	16.95157434
449	3.353702453	5.717109522	5.647684456	3.02355522	3.302307925	6.379900998	12.38582347	11.1201059	3.294005852	6.267429722	1.29304173
450	11.57540221	29.9709314	37.7348389	31.52568095	32.62407106	53.54551288	87.14812083	54.35879028	21.68645525	28.62324026	14.62007261
451	24.21973402	52.67844289	58.72338837	44.86953296	47.83348025	79.99449714	144.3222012	107.4258122	36.04973393	53.11381342	19.49874786
452											
453	18.56691578		51.7898573						31.70952905	42.60047103	17.47101008
454	17.58218905		50.19419187						30.46076759	44.44930522	18.55320081
455	27.19584242	39.72671257	55.51203062	37.76084638	45.05466347	67.78696794	120.4107269	87.65778133	32.78188895	47.51012919	21.34994275
456											
457	21.11498242	39.72671257	52.49869327	37.76084638	45.05466347	67.78696794	120.4107269	87.65778133	31.65072853	44.85330181	19.12471788
458	5.289146004		2.728862137						1.161677329	2.479636212	2.001625209
459	17.58218905	39.72671257	50.19419187	37.76084638	45.05466347	67.78696794	120.4107269	87.65778133	30.46076759	42.60047103	17.47101008
460	27.19584242	39.72671257	55.51203062	37.76084638	45.05466347	67.78696794	120.4107269	87.65778133	32.78188895	47.51012919	21.34994275
461											
462	20.38437079	37.89067793	52.37698562	35.32974587	44.42608348	58.72003639	115.3396245	81.66204777	28.44461836	47.26431326	18.27699956
463	21.43556677	39.36326798	48.48429126	36.21931925	46.8989567	60.5036332	114.8215632	77.32992781	31.00371158	40.90212878	20.63335663
464	21.49196727	36.29438664	51.01679931	34.44892981	43.47987148	68.66155683	113.804775	77.93113152	28.72007095	41.53980641	17.75199227
465	20.25508888	38.64998924	51.93938474	35.68151767	46.89782105	67.80258307	124.2118011	89.76269208	32.33347656	40.82790093	21.89313915
466	21.10163119	49.46433452	58.07189802	49.53079874	47.75945025	82.3303133	142.78244	108.6807268	35.05616697	47.34067814	20.04691793
467				44.74113838	44.57048595	86.0013779	145.9808925	110.2216672	31.064414		
468	19.28888994		52.94251958						32.5302928	43.96464754	18.85131431
469	22.54789107		53.28499817						32.15654592	46.79887481	21.19215203

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
470	24.97273976	45.8031227	55.88073933	42.69841131	50.38876255	66.88121051			33.03235896	52.51350299	20.54746976
471	19.0999815	39.89486822	64.95681159	36.40393855	46.0373253	77.23828447	142.1736765	115.8088746	32.23993078	60.45967112	19.21973042
472	21.60507396	34.32647147	55.7488153	36.9790304	36.66556384	81.27280693	128.2548917	96.92635485	31.69434182	49.09731832	16.79483165
473	17.38258968	37.02368314	48.15259106	37.58155235	46.58634604	53.95961061	116.0256672	84.69692782	34.31822965	35.97639671	18.91128281
474	21.25473491	38.91891733	48.44446722	33.49222648	47.12370819	64.15388988	110.519846	78.00265566	33.15503074	40.55830933	18.3273127
475	20.68404291	43.66213924	52.60384	43.30870378	49.09430686	71.78393816	120.1797419	88.13004879	32.60752509	47.43543324	18.00930241
476	22.75689403	37.24290138	49.12779907	35.83121225	42.3134514	59.3068449	115.7776884	83.00646264	31.95546638	39.30089125	18.12854974
477	19.47918633		50.00805004						28.92684584	47.87748258	17.59255753
478	21.4054308	40.6655294	48.38807204	38.79514553	44.14232574	61.97300102	100.43499	70.36766883	31.21358313	38.61507945	22.88588822
479	25.00408189	39.56309499	51.65027975	31.8233133	44.90924685	59.08499064	109.3684989	78.87315535	32.57679497	43.31214847	18.69490812
480	20.64569447		54.50343435						29.32198167	47.4777074	17.00919074
481	20.3852535	37.1415971	49.89178686	31.31224991	39.58392881	64.91683818	106.4871648	73.47443927	30.67408563	40.94574235	18.6054559
482											
483	21.11479525	39.72699875	52.4986086	37.7610771	45.05485216	67.78693225	120.4108841	87.65831873	31.65127359	44.85305437	19.12486063
484	1.84930496	3.91503514	4.143641594	4.955341451	3.447333871	9.526658073	13.77868056	14.07192283	1.780195553	5.710394069	1.659081232
485	17.38258968	34.32647147	48.15259106	31.31224991	36.66556384	53.95961061	100.43499	70.36766883	28.44461836	35.97639671	16.79483165
486	25.00408189	49.46433452	64.95681159	49.53079874	50.38876255	86.0013779	145.9808925	115.8088746	35.05616697	60.45967112	22.88588822
487											
488	26.9608885	56.28127373	81.38277029	51.5430474	54.962437	109.1036576	209.4888928	172.5098015	40.81409713	81.86339611	15.6632899
489	23.35434039	45.22042567	55.85981847	44.25954827	47.93731113	86.1874649	144.0853107	104.0443783	32.70505461	48.94692711	
490	24.76142914	44.77107115	66.13348233	40.05977814	47.88823728	90.72480538	166.1953598	128.6405495	33.45409901	62.57487853	16.48755273
491	23.40393231	46.60036243	60.29141714	48.34906532	45.98325565	83.17630407	141.0406536	101.4267145	32.61739384	55.75402449	16.08319706
492	27.00416718	58.49328549	76.82896161	53.13633907	49.94335911	114.4361442	190.4684999	143.0193916	37.20878185	75.2639873	16.70337167
493	21.74652168	49.15873272	63.13091044	46.26940165	44.38437252	90.06838121	153.8594879	116.1157233	32.05747463	57.19598687	17.29342763
494	22.50272383	43.98171975	59.57335485	42.2619016	44.10792213	85.79236824	147.6301032	111.8888807	32.60173585	52.19026571	16.87079839
495	22.68102264	44.75219456	62.58558769	42.21211566	42.32995812	90.66597953	151.8568328	117.9542965	31.35302285	61.01246263	15.47699171
496	22.59171369	45.05584369	65.10574633	40.9047005	44.05783728	86.37399704	148.9424928	107.4205791	34.92555623	60.76145214	16.77551103
497	20.20122009	42.3749322	65.72446931	40.55894244	40.57252273	85.29367283	148.3749118	111.7946872	31.25090711	63.18192342	16.75823442
498	21.51031656	43.04739636	63.0898759	40.00685674	39.54889264	91.74011934	142.5649487	106.6676765	29.85420672	57.98943417	15.98375927
499	24.49929643	47.07478178	61.39968913	44.00980165	44.43297138	91.04415173	142.8198524	104.9918495	29.4404363	57.81226559	15.96801679
500	23.09595323	41.81761353	65.39992315	40.23497599	40.14564296	87.73846169	141.6296317	108.4654538	31.90991232	63.88351842	15.10821333
501	23.95302861	42.07413993	60.22493714	39.70344639	41.81677069	89.50206754	144.253525	110.4753786	28.95175951	53.15885311	15.41067549
502	19.44771871	43.88151687	63.7491135	40.39025577	39.92570553	92.98146119	147.5194257	115.0170131	29.38553693	62.13687518	14.70967898
503	19.95691722	42.77974837	65.46743893	39.81919575	44.70090564	81.70939488	143.4876721	109.8531366	33.55418069	62.86773854	15.94560659
504	23.14309248	45.02453655	66.64638973	40.33198905	39.38510658	90.29413904	154.9739173	118.0728269	32.07132054	65.13660287	17.67537968
505	20.43657543	45.58431571	65.36162231	42.39205165	41.78597438	86.98546961	167.8872056	131.9463339	31.65520082	61.55599077	15.7332489
506	19.21634191	42.40788264	69.66729025	42.48461347	44.47774691	91.6648229	141.2302722	109.2594162	33.38758074	66.01414982	17.62879581
507	23.87827835	41.85683419	57.69467071	39.27882775	39.91439595	89.67455995	137.1962903	103.4533627	28.44731794	52.35651739	17.07201523
508	30.24402555	54.5908073	62.64620788	54.44883695	49.85394952	85.53587509	159.3482534	103.6477866	33.49272513	55.97634199	16.10574265
509	26.71085846	53.584405	63.00788393	55.80492948	47.02356229	92.11793445	149.9814575	99.46870781	32.50451019	57.85138772	16.00604549
510	27.60877017	51.28760324	70.58258462	55.91163996	52.19706788	86.63521017	160.2620527	102.6651609	32.85601352	64.97669319	14.78110713
511	25.8621222	54.22419237	61.24268078	57.34324477	51.86333565	90.0923582	163.7568593	109.5193122	32.85296136	58.09626149	16.80407405
512	23.16360933	55.86518144	72.48075256	56.43299316	50.76610685	95.78132365	160.0913661	112.2489061	30.15207521	68.59919714	14.78766462
513	31.22143296	59.6176843	67.2034262	59.53793489	54.1619627	86.96004259	169.1439904	113.3824656	31.86689522	58.92331095	17.17301472
514	21.62412187	47.78475912	63.16630112	45.74986329	45.75936988	89.3857977	155.2827018	115.5465908	35.87121648	59.84935536	17.61306951
515	23.13983457	47.75465726	69.1407594	42.41818601	46.51609248	88.00144547	159.2944349	123.0572846	31.85328825	69.28081357	16.46113647
516	24.53644514	42.66006001	57.63062956	39.44046689	40.66825417	86.49082102	153.854978	116.4323847	30.38763193	51.93708968	15.88595775

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
517	20.78566033	40.12354094	52.35803548	39.02322194	39.10252788	85.64327178	130.0495063	91.90151034	31.04158219	45.5046338	15.17110467
518	23.51843461	42.79923292	59.62026325	41.39089233	42.94656836	90.46518201	137.9738687	105.0031014	33.45706504	52.83056405	14.47793293
519	18.54852669	44.0589907	66.84957912	41.72766413	44.26845283	92.05210868	149.5332054	115.8043375	30.88331073	65.94515484	17.41316058
520	20.41749566	44.33877704	63.79043276	41.46630469	43.00151876	87.31518969	140.2447673	102.9541706	32.30841294	59.70200131	16.2847071
521	22.67667668	43.79541842	59.07874542	41.79143399	43.91845736	87.36364571	143.2593357	104.3514531	31.64491367	54.29553978	16.38161465
522	23.46004835	43.69851614	61.88830993			84.44666183	147.4585684				
523	23.36352519	42.00177812	63.39287941	40.82080012	41.26482126	87.55777119	150.2972517	114.1335933	31.85614678	59.20662601	16.78627677
524	21.68111075	60.67001323	81.09641505	51.83703119	52.05742801	116.5377867	217.1548563	182.460697	41.80937026	81.4994483	18.10759388
525	17.89857733	44.51735201	62.57598145	42.85973312	42.61745743	89.35750735	167.5008579	131.0840822	28.68440411	61.15364842	14.75451887
526	28.54005575	51.32760865	69.24851064	53.60954327	47.77296006	89.8779884	165.7523406	116.9488559	29.53576707	62.15500658	20.26579737
527	27.74374794	55.38806369	66.66343558	54.06810858	49.83476714	83.13155552	160.2119484	112.7701313	30.6496494	63.63698037	18.3049831
528	21.97485447	41.8712267	55.68385116	41.74320653	40.90484091	87.36987309	139.8653188	105.2655497	31.72312421	52.55354183	14.99054858
529	20.72616727	45.27972127	71.38126908	41.21491432	40.87961839	100.8654756	158.2209364	124.1654771	31.6737613	70.3237094	15.12002358
530	27.01307242	53.59379566	66.47633457	54.77131603	47.47799864	84.466223	151.7671879	104.8215993	29.2207602	60.29892846	18.2146272
531	29.35280471	53.1975273	74.20333773	54.54378359	46.82969508	96.79864741	166.5478095	114.419832	28.80542197	69.36992508	18.62686783
532	25.61446931	52.04776613	63.52687569	53.52850226	45.24845782	90.91829666	156.0446417	108.4432737	26.15264225	59.32312786	17.56073492
533	28.97963849	52.44104164	63.88740886	54.30982647	45.66822055	89.75059622	155.2689242	105.4837157	30.77026819	56.74058002	17.46282623
534	28.68934035	54.31840109	60.94431312	56.40693799	43.95513825	90.20953064	147.1500375	101.7595956	29.89282512	50.23099006	18.15322004
535	25.90423635	56.64221289	67.9793322	53.4459433	52.77408723	98.52426666	161.7714952	112.7658638	32.37879842	62.56397342	18.64270516
536	26.87017169	50.96749271	74.09828346	53.96881968	46.08658128	87.87155	158.2029703	111.5369489	30.26832448	67.85780854	22.06331109
537	28.13485776	50.09809837	65.27454927	49.67409825	44.79299792	92.55360526	158.157646	113.5372153	27.79411039	61.67262109	17.30770982
538	22.32021033	43.70341991	66.54673665	41.83018516	44.02913794	88.70002864	155.0649116		31.70702504	61.56155764	15.11412075
539	23.70865593	39.33359597	58.3211923	39.84172616	40.90110399	90.80523874	143.2468549	110.3933467	31.546474	49.91457138	14.97322523
540	28.45376124	49.32379749	59.31806281	45.09625783	46.91500528	84.82424434	142.0697472	101.0207046	31.72537981	51.2528126	17.53837839
541	37.28396973	44.24498862	69.02720594	30.86416567	71.33851332	75.92153193	140.8533963	113.0577568		73.73589236	23.67986576
542	21.68426147	43.08830508	60.00933143	41.2523393	43.70006111	89.80958938	152.6056147	115.9157925	31.57460458	56.49714263	17.49910985
543	16.57424898	41.84538909	57.26487152	39.21902572	38.6199592	87.5237253	140.6099111	102.8688321	30.68514254	50.67975182	17.15389365
544	22.64330182	43.23005751	65.33259941	42.47722851	45.05541793	88.55959773	144.801743	111.2768305	32.7673559	62.27838087	17.70234392
545	19.70577684	42.32006961	56.90535142	41.12449417	42.9619975	83.5117446	135.0228392	99.53893612	30.5609573	55.04272962	14.30637761
546	23.10674848	46.58547273	59.14864823	43.82480666	43.19989627		153.2929105	117.259707	33.1691767	54.65287659	17.05173633
547	22.60993364	40.99452064	53.98888783	40.84047064	45.37530302	76.42871934	134.3554157	101.3661437	30.65420592	48.02169962	18.426914
548	20.50890446	42.35542292	55.05463077	42.74316536	43.25474533	80.01947724	129.820138	91.18003518	32.57665222	48.04150748	15.10625233
549	23.7338948	46.23679915	60.8045178	42.89606841	41.81693411	83.06336813	145.8885785	109.3291257	27.20454882	56.76284115	14.31778527
550	22.37627775	48.69854884	59.64102158	45.05113367	45.41280175	87.64007025	148.2300612	110.5364799	30.26323644	56.00501008	15.94959565
551	20.45401585	42.06332599	55.29665188	41.55580194	41.58275302	82.43137008	141.5653426	98.12280692	27.8435691	51.22742232	13.24242207
552	18.00846034	41.9644376	56.93111117	43.29247672	41.3615961	84.32288949	139.998506	101.0718723	27.84916543	51.71459334	14.11100241
553	19.72812782	41.35924594	52.7633147	41.9744383	42.60458399	77.88828851	127.3456479	88.31237388	29.57742147	44.90166628	15.4426562
554	20.36127269	46.21647641	59.42581728	47.28764938	46.66362936	76.4915873	141.9173697	107.106145	30.75500419	60.07046019	14.77980002
555	16.93446307	44.61660299	58.05134534	43.21001289	42.60758421	90.09936068	147.2770969	112.8441484	30.02318313	58.47123054	13.99709486
556	21.51601578	47.68631032	62.1992081	43.07650217	45.96398262	82.50642773	154.2901037	118.5620787	32.22154327	62.7676636	16.16950756
557	24.02807512	44.98909478	62.04547176	42.89176287	43.02112335	78.81941698	145.2467424	109.1097027	33.27905897	56.25538471	16.05785483
558	24.94173299	48.56220909	66.97761706	44.10665841	43.6746727	87.94764283	157.4144457	124.5921532	31.04614984	65.09982443	15.48653264
559	22.73457181	45.00148989	59.65772488	45.9833749	43.85791987	88.45119618	133.5879712	98.79460204	29.71144953	57.01842016	14.94750685
560	25.86672002	55.557571	79.99240513	49.7522823	49.81233233	109.3853328	169.6147355	135.662322	35.15573022	76.96100264	15.48397693
561	21.68250998	43.89114751	58.20026836	44.91039681	45.87907217	80.09311343	141.5658715	96.17098228	32.19570697	54.96944301	16.62328765
562	19.23111666	41.57939526	59.54087394	43.04940595	42.42443386	83.41030336	148.6186466	113.6560267	31.23800012	56.73966937	14.21119427
563	19.11440577	39.26252994	59.40734177	40.19624029	37.47072432	82.85250323	141.0678048	106.36625	32.17683834	54.69940579	14.51127705

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
564	23.72942277	44.13476642	59.76154614	43.92837401	44.45485905	86.05219006	139.4459334	102.3370105	31.63696261	54.25914683	16.38108015
565	21.27180984	43.28927629	55.99322286	42.25158517	44.28116062	80.1388031	147.5397504	110.4472897	29.20112456	51.98567959	17.45950284
566	23.31672702	44.42214259	62.23278327	44.05620926	45.92679258	92.6481929	143.3576851	105.7499378	30.09136005	61.46292554	14.49140067
567	23.50613802	46.97003805	64.53846897	43.94394509	40.74774184	95.39805478	163.1841039	127.6561927	33.29418602	60.8011808	16.46528054
568	18.50665561	46.13502039	62.94702767	43.12001719	43.70929744	89.53435623	137.1987344	101.9204767	32.5345775	65.68392241	16.28433175
569	21.6956282	46.72412446	65.41152456	44.93003275	45.14774308	89.11155972	150.3499836	117.974346	31.67529111	65.5364428	14.73876834
570	21.66485385	42.91436698	61.18920935	40.2607707	41.22945992	81.47441192	151.5384124	118.446557	31.11438273	59.82065668	15.20332671
571	20.87189738	41.65132863	56.52430835	42.23236776	42.3148318	91.76448507	151.990618	112.2411973	32.80437576	52.80521684	15.58394155
572	20.1905103	43.60941861	55.66360346	44.02744908	41.87046834	84.20788949	146.6041566	106.8653613	32.74995994	54.79458158	15.47235191
573	25.21873935	53.99693835	59.77394326	59.06551745	54.01819856	85.82477693	152.7640241	111.4844899	36.70324308	53.77546045	14.76493508
574	24.75443117	57.27863445	60.11523259	59.39615007	54.02738677	86.45500799	157.5027894	108.3073095	32.6592614	56.09889813	17.10536197
575	27.74987085	50.70948861	61.60615392	52.3667788	48.38418527	84.00894655	160.5261447	109.102224	30.99115121	59.20627216	15.86663691
576	24.51653419	54.3883374	63.77809805	59.44512189	56.07989377	83.27448296	151.3974807	103.542278	33.14002218	62.0576446	15.06743309
577	25.8071597	59.97549076	64.83541861	61.76787624	55.44745371	91.31367114	170.1609648	125.0428175	32.44095853	63.7302221	15.12001798
578	28.31268033	53.95986074	57.68416455	59.66169586	53.45005389	83.98102831	153.9703435	102.991334	31.10189257	55.04373665	14.88816417
579	28.83085479	52.0935775	59.05354748	54.36710673	51.08590289	83.0161873	153.0186289	100.83235	31.99856232	57.53334962	15.59856211
580	27.82558307	47.59206721	57.21380746	51.84766091	48.40976654	74.59430973	149.9598435	102.4990757	30.88522214	53.28429316	15.56837175
581	20.27758472	43.2946722	69.81226815	41.94407452	43.12181662	89.24682274	148.4191171	115.9654668	29.91198661	71.54942052	13.58490674
582	21.25119711	40.01166087	64.16937909	39.9915008	38.99076813	88.05535849	155.1784768	121.2617151	31.65740517	61.56479879	15.28760388
583	23.2551506	40.43547697	57.34689385	40.32757144	40.12742863	83.60843898	139.4516877	103.8855296	31.07666371	57.4124628	14.96059896
584	27.39449514	52.31414521	73.67536122	46.52499226	49.2731004	113.5267897	187.1528538	143.5784644	40.65429176	71.27244134	18.871435
585	20.06464342	39.62134661	55.28081073	39.6317946	37.75305998	89.1082577	147.7515426	109.0512664	29.36201006	52.42781181	14.222538
586	21.62064903	41.02066236	62.84260503	39.70467852	39.33542297	85.66113502	144.035431	108.7554728	31.89364746	60.46224465	15.46631767
587	22.50118356	44.32167627	69.56982593	43.49301342	43.83709613	97.13483297	152.4108203	115.0853894	36.5169647	63.47938195	16.59236486
588	20.38800877	46.49722476	63.45624393	42.6168597	43.58210513	91.18753178	151.8974264	115.3074797	33.861419	61.00487792	17.1899876
589	23.18546752	45.00214147	63.12258765	41.43382503	41.80084259	93.26689346	151.0391961	113.5999726	31.15431865	59.23908467	16.46570498
590	19.97509492	42.26203169	59.55467537	40.67240619	43.30257014	85.77607472	148.9696171	113.5089001	32.6529918	55.38398682	16.92358864
591	24.13659224	46.41749992	64.29487851	42.15311307	42.49446013	102.1841287	165.1052699	127.6387891	35.99963396	55.91368916	15.97327852
592	26.46731442	40.95969588	62.17978336	38.1451737	42.80835956	82.03524248	146.3448527	110.7594418	33.01724779	57.80302516	14.57534785
593	20.85294126	43.47511298	66.54078686	40.5516192	42.68795024	86.44748285	159.307769	122.2735859	32.71167803	62.87582902	16.14713366
594	16.62722078	45.7016617	66.3186727	44.58859817	42.89328935	90.30904578	150.4349065	117.5677977	32.13766521	66.00312116	18.05372133
595	23.47667061	40.38059953	63.67192162	43.62720646	45.11792892	104.5354698	172.595714	141.7139785	32.52468324	64.19459343	17.22288486
596	24.77703688	44.06419167	59.97211903	42.00469806	43.87939829	87.74414349	154.2048826	120.5011097	28.9617039	56.71658229	14.86773389
597	23.25639478	44.86538107	63.18292127	43.35627664	43.10003659	88.41997228	158.0241257	119.1137956	35.24909564	59.28990683	16.1570357
598	19.47465107	47.79686413	66.53765132	43.40793236	45.90850164	92.90906263	166.5245033	132.2531563	31.04108452	69.12692403	14.70379402
599											
600	23.3010216	46.62866378	63.10036481	45.42444632	45.07834762	88.76997064	152.1953608	113.0456309	31.86190969	59.57232075	16.22261465
601	3.407860243	5.214503913	5.640124885	6.226748343	4.832338992	7.328067297	13.59155446	13.52305116	2.501840117	6.903126539	1.593073404
602	16.57424898	39.26252994	52.35803548	30.86416567	37.47072432	74.59430973	127.3456479	88.31237388	26.15264225	44.90166628	13.24242207
603	37.28396973	60.67001323	81.38277029	61.76787624	71.33851332	116.5377867	217.1548563	182.460697	41.80937026	81.86339611	23.67986576
604											
605	18.04470165	51.10974124	62.90964157	48.46818487	51.2495574	85.60350902	163.9222694	129.8684112	35.45931589	63.38280984	18.38155009
606	21.84181163	45.5663245	66.02974107	43.29633646	50.35646857	80.8543141	154.9548257	114.8027182	33.97126024	60.89137939	15.19026483
607	23.82823688	42.9512739	58.97846399	42.92001691	43.934478	86.56578204	157.5532637	126.0774897	35.34819157	60.4304735	17.73324228
608	20.68382126	42.67706868	57.95040109	40.725205	45.6573288	83.32364251	148.3496592	107.8517011	33.9886572	54.71005091	16.33338081
609	25.21801795	40.19629798	61.12230429	40.01603877	40.84447942	90.17402807	153.7721325	108.3592527	30.65898681	58.30642227	15.79743094
610	23.14740987	52.36028085	69.22158513	51.59216464	47.60496444	93.92777096	155.5674805	108.0645942	31.49629483	64.66754956	15.8509239

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
611	27.6926107	58.22552177	75.87821961	51.92843876	50.76034532	85.51645534	167.5215371	121.6406393	32.67412245	70.66602461	16.36762905
612	22.35018072	43.87844063	59.05969231	42.88740316	41.18448451	99.52838666	137.274694	98.32535736	29.82775962	56.36144458	16.04900307
613	21.79642488	50.3581623	66.41298521	46.06976578	44.02115909	87.97155437	155.142857	115.4094257	28.87903081	61.26089499	14.49966882
614	20.31393857	43.60836986	63.56650803	42.42063093	38.75304595	84.40305785	145.1750059	101.6128993	30.37085478	62.14253708	15.80812685
615	22.24757152	45.88411316	58.49593645	38.73246461	42.68030789	81.30005505	121.2503196	87.38038392	28.22895607	52.90548949	14.27662167
616	23.51536626	44.35632886	71.79591744	39.87616824	41.97165678	96.15905738	155.2502328	116.9517804	33.67991745	69.00057609	13.82551189
617	25.21550715	41.53926692	71.55260332	38.05682008	39.31450801	91.72105117	141.2366403	101.3203758	31.49016792	67.20780249	16.07924025
618	24.80259028	48.30355683	55.39313155	42.53650842	41.84429761	94.55062034	145.1495702	103.840326	27.56542523	50.60935887	14.71660537
619	20.26468628	44.35197389	65.43270043	43.15248615	44.29400457	94.40423995	160.379957	121.115434	36.86618736	59.03487078	18.27585626
620	26.70804295	52.57057394	59.31287676	56.81496133	49.29549519	82.97575719	144.2930756	88.83523602	31.37848954	57.1144051	18.32993487
621	24.7397877	58.10155687	65.85670345	60.37953709	52.21741256	78.37616075	144.5326594	91.97828927	31.92436883	61.33159533	13.56993112
622	28.10496484	53.87453699	60.39837494	56.9324865	52.14479397	81.97291992	146.5362688	91.84196865	30.62400119	52.12641575	17.44234377
623	25.21801795	40.19629798	61.12230429	40.01603877	40.84447942	78.97891313	153.7721325	108.3592527	30.65898681	58.30642227	15.79743094
624	25.48141118	59.98644261	63.66011629	62.37445636	56.24787507	85.27258394	171.3384124	120.4545984	28.50199211	62.09006199	16.6671885
625	25.55777393	49.55422691	63.68046196	44.27324985	39.64460535	96.31760044	160.8045224	123.8819917	30.27805195	59.24751574	14.03366768
626	24.33493211	49.26703925	70.80729061	44.73899235	46.14230799	102.9666636	164.9054836	127.1452056	32.60876265	65.20199414	17.58841913
627	26.7381252	49.91559023	62.63299428	46.00839293	50.84249111	89.30425578	153.1590016	118.7957227	34.4877321	59.55465406	17.55384954
628	25.23507407	50.29683076	72.88254912	44.73704561	44.0645695	93.37726124	159.9817562	119.3748471	37.06117008	64.40971458	16.63822401
629	20.88430229	43.29321455	52.78318881	42.90368814	41.21662957	84.8842613	133.038472	95.95104282	29.95809455	50.8134143	15.84621421
630	21.26421842		60.40191972							66.59530816	
631	23.0606117	47.04218267	68.51334395	44.41740221	45.17434292	101.0372488	167.5967681	134.4870795	33.34340691	68.02922134	17.35310808
632	22.45535389	38.53533682	72.15662874	39.22661066	43.13031686	86.58978288	153.8657421	117.5257144	33.40830386	67.54561681	14.4535971
633	17.09330619	40.61128524	56.36665952	39.65035126	45.9354386	95.62248851	150.3777801	115.2143709	32.72371036	52.94101611	18.7658784
634	22.20987924	42.78400425	57.28419469	38.82425596	43.75332073	94.04238856	148.5835986	114.8979089	33.88917533	54.38792498	16.31720078
635	23.94460582	41.32395596	60.26876796	39.39241488	47.35020882	87.07829797	142.3570637	106.5705445	30.9077816	56.5142058	15.84666757
636	23.47189268	43.50407885	57.48165855	47.40393984	49.24693914	88.50641822	143.0476812	113.9829404	36.64172288	52.2903594	15.17250404
637	23.29132301		62.50427253						31.24747531	56.8090494	15.82058477
638	19.36487238	40.17222697	60.70142668	36.24266085	39.30175755	80.13626143	150.3873775	112.9170079	30.85067644	57.41972317	13.44903616
639	25.46230039	45.48770368	64.81876318	42.48277269	46.14382285	101.3451072	167.0572916	129.0676293	31.55481677	64.11288153	
640	22.30319594	49.09868539	63.60292654	43.38022915	45.99747247	94.0276267	159.7054292	127.5611051	30.22287444	65.33276836	16.92227745
641	23.66338633	42.26314619	62.80553816	38.4529407	41.57838233	83.86082761	159.0739213	123.9142829	30.55912403	59.02190392	15.80038296
642	18.96876978	38.77438552	50.75318901	37.89971024	36.08153344	66.681767	104.0596053	66.48766735	23.70411261	46.65932747	15.96119231
643	32.58197947	53.95161122	75.33400346	59.5318787	52.32892592	82.68328236	172.0152846	114.2427824	33.27018805	67.99215919	16.47272649
644	23.89969982	44.44532839	64.90735013	46.49716864	44.28163338	77.33396654	142.9890898	93.8228727	26.94334624	58.41437213	18.23327395
645	28.1339185	49.73810938	61.26656122	52.91502142	46.76311504	81.73517154	143.1492996	95.61229796	28.00388989	55.13021102	17.9383614
646	27.57449832	51.20375203	66.95400212	53.89750481	48.47035355	84.5528046	158.697721	115.1222439	37.17954061	61.42125407	16.84574986
647	18.91142009	46.73628751	60.97497593	52.76977755	43.52452051	72.40303209	142.8245074	98.19425797	27.3101582	55.0849115	18.60619529
648	25.75476529	59.63572121	75.64062324	58.15231967	48.55646073	83.50635642	162.7867419	118.1603116	34.5474687	63.4388679	21.34295974
649	19.20478977	49.66273026	62.35002284	50.67853104	44.38288237	89.78279292	154.6301499	109.6028467	30.96778176	53.53328813	14.58564266
650	23.49674994	51.90078419	63.98592434	51.85312314	44.12666096	74.83701573	148.3927298	115.1119597	23.331662	58.63068515	18.6637716
651	25.06070934	48.51177202	66.65112333	47.34547953	45.3043884	94.07410812	140.2892416	99.36774912	28.11105644	63.17366395	15.63612246
652	20.41333016	39.32184313	55.45369819	39.36509808	41.37647584	81.80503166	138.8203917	97.83852891	27.32388903	52.12514435	16.80307481
653	24.1799285	48.06760339	67.17734595			104.3216796	154.6948414	124.1803623			
654	21.39640915	40.80222708	64.16419652	35.74796171	44.54153299	93.46046758	146.4116454	104.5264349	31.60267703	60.68397355	16.97650409
655	24.04989094	47.87318972	68.44962328	46.78853766	45.11251879	91.07804173	160.6875775	123.5895592	36.16878772	60.32041857	18.17687917
656	27.84512904	46.87714223	71.70833504	43.26488555	45.72693418	94.06065478	151.7464465	117.1139916	32.62378664	70.25221288	14.76635521
657	19.14015122	42.65383406	63.5770879	35.60582562	41.86314997	97.10214231	148.7911838	110.5223276	33.04903015	60.97199919	15.55537032

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
658	23.64981481	42.36189575	64.39011106	43.26681741	41.38881597	89.88037432	153.6122401	112.8951973	34.42093829	59.85831141	18.92337762
659	25.36926756	54.32248383	76.12255089	51.95427529	47.78549576	101.7601664	174.3000859	138.5666502	36.91249556	65.68013015	16.05891198
660	18.85666126	42.77803379	64.65848721	43.38636165	46.11664517	89.39534457	156.9694891	118.1823717	35.17560862	63.0748182	16.6813982
661	26.89267763	46.38513458	62.49896499	46.20604982	46.71033809	91.78887863	137.3339765	101.3388086	32.47069394	59.48583273	15.10000149
662	22.86636027	44.73813578	61.78023282	41.98894595	42.86916483	87.5309814	141.4751327	108.2248718	30.80486426	57.26237639	15.80016025
663	22.53318173	49.33175266	64.63747319	52.80204851	47.67730812	87.5995152	159.0756056	112.4488491	30.98346913	63.13897523	15.61108652
664	22.19818683	37.51390353	68.8299505	38.36958951	38.51414959	88.10918157	150.0727258	117.961153	32.30032411	68.71910492	18.68719257
665	18.6325707	45.81084177	59.6898736	45.10012604	43.838554	88.66122876	148.006454	111.1030848	30.61748959	59.9080168	14.65026662
666	25.66251968	57.87277552	62.01831904	57.64602499	53.068803	78.81522191	164.6644294	119.5981659	33.05431861	60.87896824	15.93160258
667	28.54218496	49.61715503	57.75448106	54.166726	49.08720701	74.73054429	150.0322121	104.5475772	34.47053387	51.53345551	14.52546876
668	30.70365177	49.44219722	65.0208871	53.21297313	56.33271591	83.03640648	156.8570247	111.1308709	34.62242762	61.26622707	16.99791587
669	23.82704127	52.41464185	55.18997749	60.05848805	54.40627221	85.21142307	146.8258327	96.3225067	29.64557227	54.66566528	15.93902204
670	23.05898167	41.77179968	61.59028125	38.52109579	39.84460319	92.23717288	145.8561125	111.568301	29.30387935	58.60818759	16.18497181
671	24.65189138	50.76877452	63.17154455	54.56470163	52.73878113	79.29008536	167.1862646	123.6615109	31.83473285	60.6634693	15.99390981
672	22.867869	48.3995279	55.41418927	53.92192026	47.30494419	76.72636663	150.7155691	103.449376	31.29563519	51.52828654	15.99003326
673	25.64007527	52.76459808	63.75748411	54.88429575	50.66123515	76.04440835	163.2798682	117.4295612	35.71976668	57.27896384	15.09937002
674	26.07845281	52.895131	57.05980095	56.53977438	52.28538747	85.64625257	149.8776884	106.4831918	30.55872988	55.29862462	14.48918451
675	21.78147834	50.42536746	66.85811878	46.53963073	44.30271866	92.00662192	157.471866	123.5541161	33.40624855	66.74611336	14.47961735
676	25.39865825	49.3349174	66.35635306	42.84212902	43.53081478	91.28143046	161.7967095	121.6693675	29.85390455	62.83391735	15.26803208
677	21.79198706	38.2704139	62.11458995	39.51710207	37.63744275	86.58855965	144.799978	111.6346803	31.61740446	60.4774464	15.04636555
678	24.96177409	47.81369474	74.76491253	42.65142807	43.75150658	98.36084483	170.204377	130.8830578	34.18024352	69.82249806	16.54759691
679	24.27965687	40.31787389	54.41222892	40.25647088	42.02819294	88.68854314	135.8296474	101.2367239	31.88330426	51.43325747	17.22178743
680	16.46315251	35.53574277	40.64346697	40.59638266	37.5197567	71.22556144	103.5793498	68.05603161	27.18658862	35.81552164	13.04976724
681	28.00555306	57.76054769	63.60840866	58.73537491	52.11673887	101.4421281	170.7414088	122.8856067	28.09865315	64.19684375	15.22388678
682	28.49878843	54.89232248	64.67304151	57.58937031	56.17815139	100.051182	168.7853615	127.5967661	39.40492769	60.45104728	15.71167105
683	20.17746	40.10442038	55.02564622	42.00864971	41.34650821	86.03574036	133.3589158	95.96173963	30.68770363	54.24581479	17.40968171
684	24.68249685	53.21440917	67.83458206	46.2273388	43.76951017	104.1674092	155.9167254	118.484456	30.06065983	68.51673367	16.20402236
685	21.32564543	48.66237692	61.90552324	48.74208059	46.39894525	93.10052299	150.0747205	114.841999	33.15806105	60.33460856	15.86627962
686	18.28855778	40.51030535	53.15241986	39.23186704	40.53806715	84.50336973	141.86305	108.7978404	30.62275807	50.018499	18.44712211
687	24.00956648	44.30159069	55.41673578	44.01691913	42.11353453	94.22809177	143.7113317	111.722882	27.25880734	51.44590538	15.70123887
688	19.67899948	38.49027057	61.72254311	37.56839074	37.38576522	85.81814902	148.6228692	114.5047107	29.60024661	59.48399831	14.76903631
689	21.8269552	42.18176909	58.27413023	44.80832644	44.7396476	78.19139382	146.4277742	112.0202391	31.32953883	55.49637815	12.92146457
690	23.60734504	43.79918374	64.14497435	42.25931964	41.95798062	93.93265156	162.4275031	126.3471583	34.16701655	62.54614402	15.88521257
691	23.86570538	44.74366082	68.01315788	39.08038218	43.98412338	93.54040679	160.2097818	127.8580094	32.20958963	61.81714352	18.20162766
692	20.8890443	46.09134624	65.67960052	40.92622106	43.95138071	96.5358606	167.1971688	129.4275146	34.47675643	66.75762832	17.41516209
693	20.43419019	40.71717083	60.95285226	38.9424071	38.35816372	88.81440774	146.3591148	106.7186003	30.31056575	61.74401254	15.38461834
694	21.22435867	51.79305698	69.88972993	44.02388917	43.89564147	105.1808316	175.3476766	136.3463643	35.230497	66.76175226	17.22146213
695	26.28944027	44.75800872	67.82617301	40.21681162	43.95475816	92.50628312	153.1264764	115.722679	34.42472494	65.90113368	16.17531172
696	22.85513192	46.25760308	58.08274295	40.83712277	38.74281594	94.11347033	154.0211127	121.6720628	31.23792087	56.40586874	17.8641791
697	19.44025608	45.73993011	57.83935803	40.8984494	44.99892372	89.72210301	137.0785028	101.9344588	24.94349573	58.04115078	15.87029648
698	22.82299997	43.41995854	63.05264867	41.60334947	44.89630034	92.15997823	142.1208419	107.6585929	32.34690875	55.96835332	14.77038123
699	19.96107118	41.4628382	54.02309194	39.20345523	40.16116532	89.75945377	142.7125773	103.4027525	31.05558522	48.20919087	16.65710608
700				44.77904998	45.27605533	95.93789955	147.7360311	109.8396415	35.00301489	52.40955087	14.01402063
701	19.46703157	44.67595205	63.45521447	45.66814214	44.60695025	85.55296541	151.723481	119.500506	34.08633387	60.05772592	14.97182874
702	27.03511367	49.81013008	67.70524718	46.06934069	45.1841423	88.44858204	166.9656997	126.0071794	32.82976201	63.73753001	16.6525303
703	24.50432263	50.40367402	68.97692413	46.59068458	46.22667133	96.21873106	166.846691	132.1835367	35.23713733	62.89453074	17.56336202
704	23.24425785	43.03656216	68.29897569	41.5937798	43.0005281	89.67709116	157.0495247	120.7258632	31.62379853	61.48140853	16.48943928

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
752	22.28516767	45.60391489	58.52192951	44.97792555	45.02150726	82.13985666	142.6906387	106.2086949	31.4930048	52.74137167	17.02249675
753	3.839964725	6.964262032	8.487507683	6.841800126	5.104155113	11.70572257	19.3156878	18.28082808	4.012887473	10.13362724	1.971629141
754	10.51772545	21.86398462	30.62192491	25.12743783	16.09434377	50.02118621	80.99695811	49.77018205	17.63537422	18.77359035	12.30476365
755	37.28396973	67.26324553	85.05948567	68.62858126	76.41021586	116.5377867	217.1548563	182.460697	50.05334944	81.86339611	30.59071493

University of Cape Town

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
1														
2	PMM-PET	PET-L	PMM-POR	IPM-L	L-A	L-OPI	OPI-BAS							
3	103.8484004	188.8133821	133.621856	64.67793677	61.31147182	224.2627693	26.22815603							
4	109.251589	187.1366008	139.848668	26.25178463	65.08274076	225.7613087	23.3405406							
5	88.8553725	151.7746849	90.06701558	26.10503957	57.99924463	186.3494586	24.19573731							
6	88.11391008	146.8068926	119.3559669	53.45675164	52.08353278	183.4148561	24.92390977							
7	82.20394003	151.8996268	113.7158313	31.08629547	55.09903902	188.0810073	24.09119041							
8	88.26235805	145.7364087	115.7324064	30.19101403	56.53834503	180.1059985	24.20310765							
9	90.21437537	163.7915819	120.628415	92.79480991	55.29745242	197.1757743	25.18435771							
10	87.27645264	145.631251	117.0946927	63.49302799	47.7104406	177.8152221	21.61738772							
11	85.40335406	147.9146488	112.2583043	66.08822737	51.2161002	181.4900629	24.80369255							
12	86.89662484	139.9922548	110.5458358	48.21062706	51.74321383	169.7496089	22.70246152							
13	86.36071705	156.6828772	116.7016943	54.3267491	54.2868517	194.8435614	24.23032966							
14	75.59873102	131.6661899	102.9981653	44.12909115	49.17984199	166.0795002	20.81799219							
15	84.83606284	138.6886464	107.9842252	46.68864469	44.75553522	167.9089147	21.52680912							
16	85.45814756		109.004498				19.36560425							
17	80.88725245	140.3674959	104.2930525		45.93817576	170.5472445	21.23985583							
18	86.31678529	153.3604517	110.9851058	25.306416	69.32924076	185.7946409	25.33538075							
19	82.34568907	142.6892141	111.3678029	23.83668389	53.92174738	176.2196602	23.62330736							
20	97.4263571	161.3929806	125.4366176	47.52485174	53.07493668	197.2286266	24.1239123							
21	89.03654016	150.5663881	119.9838335	36.22135942	53.76163701	185.1409513	22.98732141							
22	90.63504967	171.1210908	123.0507123	51.84550108	59.07184867	203.4392918	23.61271836							
23	80.93124901	136.520754	109.906693	55.64506867	51.2428624	166.6416654	19.8519284							
24	79.7084781	147.7975548	97.301979	69.25026632	55.11354097	175.124891	17.74072829							
25	85.56201545	144.4780471	100.743271	46.33775957	65.32036431	169.8805071	20.9540735							
26	87.6644168	137.630228	109.7311878	39.76192904	62.05305957	166.613963	20.34212877							
27	80.73315238	157.3083808	101.3989766	68.72334468	60.43251544	189.4866585	21.51381444							
28	85.16974574	144.1063847	112.5225349	34.85472839	52.186922	181.0996145	22.26431292							
29	86.04354767	156.8752581	115.5887895	70.01875626	56.36195877	194.8828873	24.72935685							
30	85.62217989	135.8162088	113.0989981	32.31610006	52.22459689	168.0083532	21.64192032							
31	84.99887577	133.7351413	111.2904291	42.70807879	49.28469893	166.8104593	19.59009838							
32	101.9909976	182.9979525	130.5655697	32.50062557	62.94552537	223.2576986	25.86715767							
33	87.07506927	145.1520189	105.4403594	34.68136867	70.9193735	177.5434137	22.0209839							
34	87.55142697	148.877409	100.1983725	32.84821587	65.55297949	172.5341784	22.53012461							
35	87.15581129	139.8003032	109.9442665	53.613526	49.15444185	169.1570698	20.52253669							
36	80.81071684	140.4537801	105.0465161	50.75709463	55.96595511	173.6208842	21.87600955							
37	90.09345898		115.7142825				21.69875222							
38	91.32608335		111.4118615				20.28454584							
39	94.68497956		119.0100428				20.46334067							
40	89.63101406		112.297717				21.72443784							
41	87.80953764		112.6882306				21.29187702							
42	86.43780994	145.0900696	111.1705196	40.97853313	52.4233174	158.7910506	22.63451213							
43	96.99478896		127.0154701				21.57881183							
44	86.40544859	156.3230319	111.5538242	24.19977441	58.62848213	189.2407635	22.59321511							
45	95.80116897	182.04549	120.6934276	35.00834737	59.57767638	214.0628466	20.21792579							
46	86.59721723		113.6465062				21.76358104							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
47	90.46720113	160.8835801	120.7689066		55.09168199	197.9561396	24.15839616							
48	84.53202368	139.9939009	113.6701178	29.92262217	51.44233608	173.3359607	20.1372076							
49		160.0996049		37.63622541	50.62086266	190.7102896	22.06340555							
50	92.75349028	157.1216271	120.8583583	34.03969157	52.72670852	191.6003756	23.31795501							
51	91.41882631	161.0526248	119.9059733	42.15939533	50.28004035	196.76457	22.40492466							
52	86.60990139	159.6646029	114.4411344	31.99207175	46.22774027	191.9728719	24.15414592							
53	88.11118864	149.1443613	117.0740521	27.52559007	56.14493595	186.7182153	23.87806218							
54		183.7370081			68.84895445	223.1495007	26.3483078							
55	115.4814691	196.9650091	149.7812481	41.14342846	65.27621263	234.4676481	25.00190502							
56	100.0336541	172.1902598	132.9527263	36.57747504	62.59269853	209.0859006	26.21800813							
57	80.61600028	134.2032202	106.6296894	40.96021971	52.58048687	168.5769328	21.47689635							
58	65.32030312	113.3594525	108.3479213	41.51416644	49.14892345	157.196354	21.57857378							
59	87.1430269	125.3870005	113.8961909	39.22518453	53.34531034	136.444006	21.84829272							
60	88.25824652	142.1887833	114.7466678	51.79113863	51.55705764	174.2601306	19.50383713							
61	88.81174946	153.8695741	106.9370691	38.34233691	69.79708948	183.6103821	18.73217923							
62	79.15460654	148.4143856	106.0774204	58.40243655	49.89806556	179.6143064	22.12173327							
63	83.04746	132.0190978	109.7486644	31.53954058	52.33727722	164.8115233	23.56634281							
64	82.42240066	144.0056765	103.8552793	57.25067274	67.1123858	171.5558851	20.93188066							
65	92.89919708	159.7949368	117.4459577	81.28575078	62.70103015	190.9103048	20.04817858							
66	86.10539587		109.2595179											
67	84.67894449	145.1121844	114.1385601	63.38857656	54.54114121	179.813124	22.27065329							
68	75.78574885	133.6462627	101.2689868	69.77096329	54.61189097	165.4515578	20.76900575							
69	83.99707149	147.1191936	103.4922299	37.65445191	71.51169001									
70	81.98598169	147.9829087	101.544589	33.4455016	75.82547314									
71	82.07702652	129.2460255	103.1522325	23.05383687	72.27747913	164.3458838	23.15637205							
72														
73	87.57817632	150.8040327	113.3231047	44.65016852	56.88811899	183.6296073	22.38691227							
74	7.479688266	16.31215257	9.912143549	15.54756755	7.41022683	18.97205918	1.947353659							
75	65.32030312	113.3594525	90.06701558	23.05383687	44.75553522	136.444006	17.74072829							
76	115.4814691	196.9650091	149.7812481	92.79480991	75.82547314	234.4676481	26.3483078							
77														
78	58.37733129	109.8558101	75.12340895	29.87355024	47.12927753	137.9437294	17.86379757							
79	95.60138689	160.569786	125.3295282	39.69352539	64.03800719	199.3674318	25.1072199							
80	90.71845601	160.2697555	120.4409166	76.08693463	62.39356573	197.9469317	23.53303445							
81	74.45326045	129.6278746	97.44222804	41.49654832	50.18603925	161.1707583	22.16294082							
82	96.59585239	153.5055123	124.2964592	40.09498531	52.48679574	183.867607	23.93628042							
83	96.02386221	158.9959837	124.2833026	45.50562957	55.13062815	198.6348803	24.87491812							
84	87.80063189	139.9089873	111.4618043	29.63463675	55.31477719	172.5817619	22.67605127							
85	92.11170221	156.4201482	118.7557436	45.71806473	54.14171131	190.5165282	22.65562855							
86	84.74230631	146.3457964	109.5545911	32.48625383	61.24531142	178.00107	23.2034942							
87	84.74443917	149.5283699	112.1957734	34.40491451	62.23561543	184.7772323	25.73913328							
88	88.5308722	154.8102256	115.8408774	42.20601857	61.11388471									
89	74.30018678	131.7709526	99.25579481	43.5990244	52.15355009	164.076423	20.40983818							
90	91.56400734	151.8074394	119.6271064	51.30749035	63.43530056	185.8709828	20.74815106							
91	87.99140566	165.4864609	117.2719865	40.79515496	53.10663714	199.7043415	23.01062053							
92	90.75768996	155.7652874	120.1761734	44.58566494	55.22391735	187.9861966	21.88913009							
93	95.80931426	176.3805525	127.4455207	48.49782917	67.20383807	212.431668	25.52127037							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
94	72.95053696	118.9460723	95.46049378	20.69149806	57.10479815	146.4393249	21.60062366							
95	70.6410728	118.9697337	93.12566306	33.88139056	51.26878569	146.275681	21.40441735							
96	89.33993761	158.213789	119.583492	58.03119214	52.61279356	191.0780869	22.96161504							
97	93.17367181	165.2034111	118.5092403	47.02754809	52.79250607	199.987313	24.72153162							
98	87.97889671	148.0921325	111.4255102	44.87154984	49.77896668	185.1438307	21.98698808							
99	84.07169535	157.9570964	112.2564997	57.5788258	51.27651692	194.5763406	21.71743779							
100	92.96943329	162.1364429	121.4433119		65.90644595	197.5752174	20.25963316							
101	96.03828403	154.4674291	123.4625285	36.95758139	59.68250542	189.0624642	20.85531499							
102	91.94491292	150.2788524	116.4631823	33.85157445	59.14242571	183.2643813	22.35870531							
103	88.80071793	140.8016049	118.1145732	30.06765625	60.08933923	182.0905163	26.32073899							
104	87.89676233	157.4891081	116.3129463	59.68056277	56.23526651	193.5892324	20.53612723							
105	68.46134062	137.2401278	92.72125234	52.7932552	48.61692778	168.8426211	21.82389788							
106	81.66211909		93.57090604											
107	98.6946628													
108	93.69301714													
109	84.32722602													
110	80.76962064		102.1170812											
111	87.08312419													
112	88.98872312													
113	93.21020903	153.4578378	112.6542889	20.19301041	57.40103358	195.3724127	23.15523782							
114	87.85842405	149.5677657	110.5985877	45.8906093	65.83167533	186.4964612	21.18834986							
115	86.4020411		110.1104592				20.7310134							
116	67.81107822	126.0462379	87.40484249	25.88024221	53.87930226	154.5352692	20.81513195							
117	91.14173675	143.6955637	117.187173	51.94228304	59.80905393	180.6098146	19.67415288							
118	89.11568238	145.7109171	114.1456571	17.54173238	54.10756306	180.104713	19.08694391							
119	96.16816274	146.0652351	123.0689907	15.99024855	52.72668002	184.9331152	24.62951758							
120	81.30457859	134.609458	107.4051857	20.15437032	51.17138798									
121	89.65700989	161.3971193	117.3927464	49.81663247	57.85067603	197.9677937	23.42980137							
122	103.7156107	162.2953951	133.5271822	43.05116346	52.32973222	197.2147311	20.60025509							
123	94.95833501	152.407436	121.1713193	42.46857112	62.93847783									
124	111.6036913	185.2348762	141.2936086	69.59337797	57.04235288	223.0753586	23.92678121							
125	103.5623884	163.1609011	132.4528036	47.31000136	57.64095865	206.7332221	26.1261484							
126	85.02662708	159.2723053	112.6675811	29.08814796	66.32699491	196.7918134	22.1455455							
127	82.44018271	144.5788477	107.1897206	30.4102944	52.70870381	180.8923093	22.17538216							
128	89.30532162	155.8059575	118.6683251	44.79914432	58.36455954	194.5668389	24.07203874							
129	92.43807705	160.1697956	119.5301251	41.03484222	63.7509374	191.9486467	24.78294949							
130	87.92919553	152.69249	112.7986999	60.44165676	68.75428048	185.2921634	22.85184205							
131	86.96731766	159.0255906	112.1972221	94.02542452	61.41570388	190.7625874	21.62249732							
132	87.8726575	155.4443633	115.1133938	70.43280758	58.05539113	188.4416794	21.56761697							
133	81.34057555	146.6808804	107.9242584	89.96083348	44.109365	179.1083781	24.94525915							
134	88.77472783	162.7707204	107.8768078	40.75626674	68.61757631	195.1160148	20.22322918							
135	90.3267211	161.5495929	121.4108913	52.9091226	58.88854264	198.5539232	22.25865297							
136	68.51207096	99.48088074	84.55154319	31.68303547	47.2202638	127.851918	20.87636975							
137	66.09949311	110.7880715	86.25855907	32.70302934	48.16156913	138.189149	20.44592634							
138	80.48678896		105.4334701				20.20181183							
139	68.13313064	128.2832699	87.00880824	26.35342427	53.76994393	156.0605464	18.98586393							
140	65.97013871	109.5602448	86.82074316	40.2352955	40.04728376	138.184154	17.17136472							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
141	89.17294256	147.6534935	118.512562	44.07492246	56.06030168	179.072451	20.60398292							
142	96.66200374	170.3599394	126.1168043	61.83839519	68.12575523	207.4811752	23.74423445							
143	90.61943544	166.2738821	121.2679152	40.15265808	49.45252791	198.5930659	21.45635983							
144	98.38649898	159.509969	127.500166	44.44097016	54.70072184									
145	93.00577434	149.6518092	116.4213555	39.1979666	49.21160347									
146	82.57092009	150.8937847	109.4455076	42.19127721	56.59332897	187.6163955	22.40240724							
147	102.3871502	165.2051655	127.9291729	34.82169236	61.5080258	197.3089208	21.10923208							
148	88.59215087													
149	107.5697581	162.8797816	135.8112921	47.21765844	56.87793204									
150	92.05242716	164.9705161	116.5622329	44.11960948	60.13975001	198.3820948	22.49442999							
151	93.89082789	162.2010023	125.2652395	48.40888375	62.99802703	202.4188216	22.50750069							
152	100.3464747	163.8305348	129.5909372	41.6618204	59.02442383	199.6987196	24.81798477							
153	89.04618637	149.7527704	118.5949732	37.37587569	59.09615274	186.4146124	20.30404602							
154	96.08456204	155.6461935	124.7469708	31.39077246	56.88041499	193.0114621	21.9498443							
155	95.88157435	152.4051843	123.2432175	52.83679131	56.40738185	189.5534749	25.44559698							
156	84.6942801	157.673608	116.610495	38.30055105	50.30086139	191.6297789	25.43749711							
157	77.38051399	147.4590045	112.0205364	41.4897123	52.88457633	186.2105757	22.63638882							
158	90.57576996	150.4526512	119.3013969	44.819888	53.49363209	184.1798892	24.7252886							
159	82.88204031	152.8952336	110.7228887	37.65048017	55.78355055									
160	94.9192309	166.8290376	125.1874605		61.9684959									
161	95.04104411	154.1760273	122.8285756	38.95915977	60.25865946	191.6164172	22.42712612							
162	91.74326654	154.1645011	122.6694335	41.22589128	62.22577442	187.6838552	22.84486478							
163	99.42184649	151.442394	127.6184451	34.50494229	54.24571906	185.9196096	21.58353412							
164	95.85645655	172.5161949	127.9711208	40.20390494	65.60783306									
165	94.47534038	165.2384445	124.4207682	41.25535907	67.76708798	202.2233383								
166	91.60963558	150.4287886	122.0439109	34.50059251	51.28751771									
167	91.97279474	165.9705005	119.3125308	50.19293228	61.0670053	204.4080762	25.04392121							
168	93.09375494	152.2954005	124.6099393	35.83276327		190.6740831	24.69314477							
169	90.2826473	154.1607747	113.8926328	56.39093419	54.16317019	186.991489	24.94316607							
170	91.10883958	159.8966683	122.1217974	36.646879	62.07426414	195.3534272	23.69040989							
171	91.21714896	162.3147408	124.1156985	47.30770721	59.79692053	197.6319872	23.43474172							
172	88.58328723	157.9419433	117.6588233	39.57477032	59.81567016	196.8010962	23.81245894							
173	81.74131196	133.6891476	105.802221	27.93751775	52.41769275	144.7645101	20.37155815							
174	92.49235119	144.8147742	115.5172903	55.38946981	45.8330998	178.5588753	22.10603238							
175	78.28905206	150.39784	103.1369748		46.64109289	186.160758	19.73500862							
176	79.88838268	139.3581983	104.5530694	74.50205546	55.90055529	172.6870543	22.24612257							
177	76.38318691	144.6264403	103.6746032	53.07557089	55.43133414	179.9998424	23.28441099							
178	98.2592786	159.1388194	119.939807	35.31925151	57.97809663	172.4408193	22.90348294							
179	90.48294893	140.4700456	117.6099222	31.12161663	47.77527314	148.3337827	23.440562							
180	89.27831631	147.6935591	111.4427702	41.00524766	53.2950379	163.2974649								
181	74.9456938	147.9689458	95.47892978	76.33286516	49.64684075	179.270865	20.63580453							
182	88.46063582	152.1324279	118.2507898	68.38512561	58.07731331	189.5619333	21.46533604							
183	94.85856729	155.2950852	117.3242084	33.30612705	57.34771975	188.7868486	21.57904152							
184	87.67007604	153.8406536	111.354305	92.53722863	60.8237054	185.8118776	19.72767626							
185	97.68147353	162.7745737	117.9956467	54.88800481	59.1264081	195.0858192	21.04180604							
186	84.00669949	151.5097039	105.9170418	42.42302629	61.03248375	169.5631848	24.79904228							
187	82.33658703	144.6575848	99.21299221	28.77355482	55.98971026	176.9094901	20.34171804							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
188	74.69461342	152.6586041	102.6057036	72.35489429	45.89964105	183.0709177	21.48110584							
189	92.32860544	153.3242689	112.0474978	73.05853281	47.50927259	185.944514	21.5946954							
190	70.38107103	124.1831127	88.46885824	50.64021913	62.0797555	156.5306727	21.21637101							
191	80.02425227	152.3709526	97.93810501	68.87000319	61.31857923	180.5650341	21.21503819							
192	72.8151939	144.8232164	93.11002519	20.67537412	61.89451229	174.0745295	22.37252243							
193	77.55205359	144.0305637	96.43613865	40.72338209	70.80364032	180.1086651	22.47076884							
194	78.76233963	144.9647158	102.9675913	36.1122458	69.00377975	179.8265081	25.57135361							
195	84.5955107	140.5913988	110.4959445	51.75745494	58.8295898	174.9115404	21.15171434							
196	84.17705099	149.6606723	106.2790139	42.43824331	55.86426023	178.3838007	21.92107798							
197	88.41569702	155.7631412	120.2153615	41.2831566	56.50042995	195.8243776	26.37952559							
198														
199	87.57823307	150.8038626	113.3229869	44.65028372	56.88810142	183.6295407	22.3872816							
200	9.180212132	13.96134228	12.0941544	15.17134388	6.056199628	17.2826924	1.903630114							
201	58.37733129	99.48088074	75.12340895	15.99024855	40.04728376	127.851918	17.17136472							
202	111.6036913	185.2348762	141.2936086	94.02542452	70.80364032	223.0753586	26.37952559							
203														
204	76.1284071	131.0011717	102.2462202	67.14214138	45.7129277	163.3039937	20.95563721							
205	80.85990163	145.7865367	105.7676279	52.7570064	46.26904525	177.78184	19.02628197							
206	77.44678612	141.6670927	102.5932062	66.64191916	53.92732253	176.5953734	21.56675526							
207	81.18402422	136.9399326	103.6939253	45.86144682	56.70343585	165.6440475	20.93024034							
208	77.46044764	129.6362876	97.3555044	38.53394312	53.83645346	159.371941	21.64943033							
209	80.37341315	152.8287338	110.0990805	66.3610946	46.3507947	187.8657489	21.0232981							
210	80.54182822	153.213539	106.3725148	81.14591943	42.86059248	181.3673602	18.94512953							
211	78.69687106	155.5793751	106.6799263	62.70748987	45.43203017	187.5623479	19.93834224							
212	85.53831875	154.4487834	107.1426411	57.28754256	50.15343288	182.3610485	19.70071014							
213	81.82456013	144.2331524	105.60828	31.51275754	50.33102943	173.7344861	20.06448598							
214	83.3471149	147.5179206	101.2974927		54.26587201	172.0158305	19.43664159							
215	75.3526891	142.5717086	102.5166304	56.05534619	49.65395146	173.4482131	19.75820248							
216	79.65888614	146.0761075	106.6425565	73.37559152	45.50298912	178.9113854	21.14183212							
217	81.69666723	153.6197215	110.0996701	69.62764459	48.75435291	184.1306972	18.39271657							
218	79.54455665	141.0817858	103.446044	60.40393315	39.59845771	170.5153141	19.70396039							
219	76.76030618	146.2992397	108.3729651	69.8498046	52.93277914	181.7046683	23.76130081							
220	81.93569687	144.2132197	109.4275851	67.5678823	49.21701679	173.288875	19.73350266							
221	84.52354449	129.9886451	102.557027	27.6049114	55.5100447	156.8543789	18.1622816							
222	79.16656835	148.1927153	103.8006715	68.20412793	47.88160995	178.1990213	21.38431667							
223	84.62980081	159.3872722	106.9837051	33.63831499	56.61640832	188.4276071	19.61701844							
224	81.41372059	153.0909855	105.5767322	27.32981822	51.16585861	188.3156386	23.69791107							
225	86.49402301	159.7669911	117.0711024	71.87410494	44.78059272	190.9866447	21.04339525							
226	80.52969272	139.3488581	106.9770459	56.53914896	43.94927845	170.6900738	21.22846454							
227	81.9127525	151.7344833	104.5176438	73.75123592	48.15753422	182.0684457	19.21240281							
228	83.89223876	157.2750241	101.2776644	77.90187156	68.14945221	184.9605079	20.78329824							
229	84.42704748	150.3117267	106.6293279	50.20729141	45.1174993	180.9282813	21.70796872							
230	81.2749264	150.6928437	109.4322147	78.56626578	43.09600777	185.0310884	23.0624209							
231	87.66412069	159.7939678	114.9389258	77.45493416	41.10520243	190.3291973	17.250849							
232	82.12013385	154.4733647	106.899068	88.90684656	47.12392325	184.4841832	22.34717354							
233	81.98772485	162.1536256	110.3728218	79.81201395	48.26407585	192.9826605	20.89686573							
234	82.69152646	142.2663281	110.5838494	43.63868502	48.76392327	171.3646021	18.72735898							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
235	81.67026364	161.3423083	107.0086691	83.91663833	47.42715258	192.9556562	18.70190562							
236	82.99457274	152.3634564	110.6227686	66.81498538	47.69448351	183.5327018	21.01987057							
237	81.6747971	150.6913097	102.4511815	68.33368602	67.875956	181.1883631	21.84910804							
238	82.07571937	155.0603825	96.57511768	60.0581736	68.02052071	183.631938	21.1447958							
239	82.95259385	152.2527375	105.593408	34.32560936	55.65829904	185.9420034	23.38862413							
240	80.45380503	159.4552767	100.5763627	43.35146848	57.54845593	191.4450751	23.99587862							
241	107.7039508	175.2998861	136.0907173	72.17929488	46.72678732	212.0155953	22.80506538							
242	83.94538859	151.291577	111.1028017	76.51469451	49.66533582	179.6318973	21.11771954							
243	83.57340489	169.1508877	109.6956222	46.16002042	52.81059277	198.3574072	20.98953466							
244	82.44932338	139.8733436	107.0022478	68.2720899	41.05331781	174.377357	21.58813438							
245	80.65915986	163.9857106	106.2583907	57.79154399	61.25498372	194.5188129	21.32492356							
246	80.14522982	121.8756258	103.8561688	24.58466615	48.1819593	151.3366856	18.96828976							
247	83.69951534	122.9841359	113.7263391	30.96190292	54.65315721	157.3984121	21.97710305							
248	75.39689322	120.1372192	101.5177589	29.41960394	45.28064203	151.3627795	21.74480494							
249	85.31949663	142.580985	109.1306862	38.89341941	55.65690879	176.3402785	19.34943105							
250	103.8455336	180.2598494	129.9092007	35.6298717	52.65474934	207.4187807	19.81442431							
251	74.65265702	133.599313	97.12600665	42.44035002	45.67887819	164.5963572	19.09890023							
252	79.71271748	141.6732905	104.1591775	49.44473665	44.80509453	172.2752164	19.39985565							
253	74.11297087	143.2153728	98.79881959	57.11818169	47.07823727	176.5533206	19.58003712							
254	80.76101756	148.9352669	103.1729157	45.17779112	51.58565477	180.3093355	21.67773813							
255	79.50981903	142.4848693	103.3869992	47.53018504	43.60863147	174.3440478	20.88482448							
256	77.69845555	143.9825408	104.5278861	67.34118508	50.02898902	172.9080878	19.76174255							
257	78.01795287	151.4381982	98.65427169	54.27867621	51.99318609	181.6574169	19.55425079							
258	77.32071638	145.4612712	102.1307409	61.26616652	48.51513244	175.9792631	20.11308782							
259	77.47512628	135.8127438	97.53677098	45.9041205	66.04162295	166.615713	21.02525207							
260	84.62942682	130.7335434	102.2816794	29.5804848	73.24989551	161.8422421	22.80235823							
261	93.61255402	187.5210679	122.1960905		50.10749489	221.5783588	23.515471							
262	83.82443166	154.8139574	104.3148621	33.24655538	64.14202298	185.3509891	22.81944745							
263	73.05569818	111.0762463	90.54075109	30.12876714	45.77873658	142.2608545	23.16478626							
264	81.50280134	136.5603989	103.4464522	45.01162786	47.77802338	169.8123748	22.74451866							
265	80.48463095	163.0004728	106.4609535	65.39957879	51.72663682	191.3860332	21.96056536							
266	80.78856396	139.9509788	104.1155895	52.36620605	49.18803557	173.6699149	21.18854926							
267	82.07885571	146.1924574	108.2964191	61.03698207	49.21004031	177.4717336	20.52303622							
268	75.92400913	129.5448459	97.54469541	32.2130375	70.97913631									
269														
270	81.76615921	147.5352718	106.1044337	55.22148151	51.15142532	178.8326641	20.85069106							
271	5.530692242	13.63329457	7.026957194	17.03830455	7.426494081	13.71113399	1.5348124							
272	73.05569818	111.0762463	90.54075109	24.58466615	39.59845771	142.2608545	17.250849							
273	107.7039508	187.5210679	136.0907173	88.90684656	73.24989551	221.5783588	23.99587862							
274														
275	71.32726312	122.3871292	92.40028632	37.53535281	41.67797777	150.5569052	20.16734831							
276	87.08591352	147.9204283	115.049387	57.54818646	49.3895833	180.0651967	22.3057692							
277	64.25775085	99.3151309	80.69173014	18.34088024	38.28380456	128.1161901	18.91622769							
278	90.55296868	154.0341075	121.6470928	61.62406979	45.91727979	189.3415239	22.25193647							
279	82.95942194	144.9422826	109.8219533	76.03296375	47.79844103	175.9972549	25.41091071							
280	87.31828421	141.1448214	112.557448	59.83391669	58.81531399	175.7360482	19.82411246							
281	92.23845702	147.9403358	114.2589107	26.45100494	60.62512377	183.4640605	23.6774091							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
282	80.72909473	137.5609254	104.3639944	16.21181874	49.95660085	166.8319135	20.29361872							
283	82.07431414	141.6693413	106.1338265	47.40720592	44.47167207	173.1389875	20.31581163							
284	81.35924697	142.5111377	103.9595212	58.34972344	52.28441518	177.0938334	21.32373499							
285	89.12149647	153.4853675	113.8908901	64.77950205	55.10392649	184.1465724	19.55908903							
286	83.53833874	145.4772919	104.6773941	29.58578546	44.15542208	176.9236114	20.00602637							
287	91.04762883	157.2183209	114.3630723	61.94370783	57.72012217	189.1402277	20.15370298							
288	79.63968658	140.8523445	105.461659	33.98091022	44.8631456	170.2131833	20.00467521							
289	78.78673768	148.0460254	105.9813347	62.35574517	41.39562474	182.4167753	23.25010456							
290	94.04673671	170.7684051	120.1570017	96.06429587	46.90338778	200.2495391	17.89412094							
291	84.97393531	150.2433723	112.7980561	31.68371269	48.99909548	186.1781082	20.82762688							
292	79.5863663	147.8677393	107.1789672	56.59344426	46.03135955	180.302957	21.23915067							
293	75.100902	144.5973879	100.8580842	52.73565349	43.72758749	175.4455377	19.91457452							
294	89.74144637	149.5000446	113.9180583	86.26364257	48.41118973	179.4961877	19.55583732							
295	84.57052045	166.5261964	99.62265362	58.07269123	64.12523108	192.7482068	19.73498571							
296	87.74862793	160.1043434	116.2954605	88.34055472	51.77066983	189.0134329	20.66446803							
297	83.87918162	153.1860004	113.3106223	66.96896324	48.38102097	186.6438299	21.39313699							
298	81.16890203	147.8838233	107.2603007	69.44020312	53.43951161	178.9132143	20.19324633							
299	64.60765027	123.0648564	84.26054387	55.52525792	41.31720555	149.5333265	19.2396809							
300	79.15092956	146.230773	105.1846312	73.91485018	43.02242762	183.4776848	22.05628687							
301	83.25514708	154.5886816	108.7481183	82.20879672	48.25355733	189.3910927	25.75550212							
302	84.92604802	148.3590642	109.254697	73.95434899	53.75707931	155.9106928								
303	75.73780905	137.376736	98.95033914	61.03049037	57.9083599	168.7496105	21.34651189							
304	84.13701031	140.2504336	107.9506354	42.3094047	46.97770033	171.0381659	19.46597046							
305	81.79981012	147.6326033	105.7608801	72.0314676	46.70775084	177.4411473	21.32520995							
306	82.3233065	150.0004814	106.9884842	36.00700396	47.89600398	179.4079506	24.37887106							
307	90.08327221	162.9316178	116.5019626	102.4370145	52.59373671	195.6285703	22.66021141							
308	86.66488977	147.4518554	115.7043278	65.90750242	46.77215605	178.2158083	21.06723386							
309	80.72372272	149.0375138	113.5702077	53.69625717	48.16871054	187.5220586	20.12543998							
310	84.56959914	150.2388851	107.1479574	36.7020358	48.63697113	184.3964506	19.78920698							
311	87.33093803	149.2420825	109.6620007	22.21684399	48.04034388	181.1314081	23.06456252							
312	76.712996	159.0953356	104.6893656	69.82901168	41.61911232	192.152518	18.69499709							
313	84.7120923	138.3967233	114.7008288	47.99829456	45.77679358	177.2118864	21.30983349							
314	100.6900875	169.1631407	124.1409287	74.33976918	45.12174949	198.1758733	19.46582412							
315	75.8534925	138.4527666	101.4764191	28.79441098	53.20617233	171.2805889	19.39000172							
316	78.30960137	157.5995334	102.224683	97.97749128	65.11654772	186.6797937	20.67727263							
317	87.50214177	157.4294516	116.0475053	56.52054554	58.97609878	188.9293088	20.91757988							
318	83.95601727	160.7903692	112.603138	59.26372088	56.86058578	192.1555417	19.02757271							
319	89.82189066	147.357311	117.0944526	45.32712676	48.23497576	180.0559023	21.21613989							
320	86.90215643	148.96798	114.0098715	70.13926401	42.34452669	181.2005569	18.88101016							
321	78.47673106	145.4402714	102.3632279	95.32252243	42.52782664	173.8871023	20.6156541							
322	66.57790604	121.1956698	73.96304612	49.16579541	66.05047059	143.5223871	18.63049564							
323	79.43024249	150.8458725	92.84754466	58.51781238	56.43181663	180.0315913	20.19409032							
324	87.9656528	171.3613673	110.1096883	80.71984189	65.69888077	206.6639942	26.40054816							
325	79.62706753	148.4099158	98.76656722	80.71055362	64.7914058	178.9720867	20.94302299							
326	81.90095507	152.5743675	97.11578078	54.25864152	59.28016881	182.2784479	20.87071136							
327	71.64496058	142.0076858	94.29410952	64.31913375	63.6935604	171.5424577	19.95320624							
328	84.11918286	155.2481903	111.1939061	34.92761546	47.41099328	187.8109909	22.64489478							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
329	82.21011351	165.5299354	105.2396153	36.14882893	54.02197934	198.3909846	22.12292408							
330	85.6086808	151.4103594	107.4549477	28.8197781	57.64264574	181.3227844	18.82172033							
331	84.65189994	151.2891643	113.244335	59.8272952	44.24277381	182.8235154	19.71655191							
332	84.15814925	153.1395765	105.9890702	34.78247011	51.90442701	187.4556168	21.76405296							
333	85.75364183	161.3078624	116.582944	65.94533196	44.16969791	196.7589718	20.77499302							
334	81.46237654	154.4863335	112.6424965	80.69316804	46.92897097	192.0383199	20.84309066							
335	76.98450114	144.6162818	105.1639581	87.47453197	50.98710841	177.3394714	19.97774228							
336	81.39334986	164.7928611	103.9845584	48.32807037	48.82839452	195.1902893	20.41392374							
337	81.5469169	156.4366085	107.967629	75.37618052	51.65062403	190.3707672	20.58098248							
338	72.59895963	142.9474847	92.35914446	39.8826882	71.04352641									
339	72.808786	139.0574001	98.9572314	37.62609863	67.15560324									
340	89.40454602	139.9283184	119.9338104	27.05731426	40.77696921	173.8815342	24.02964698							
341	79.10207696	142.6390005	100.8598866	24.47388399	70.84842902	172.3185634	21.76183502							
342	74.42819301	132.0746414	99.87553666	29.72670236	49.74999501	164.3199332	20.33038715							
343	83.79237227	155.0760575	106.0718511	55.3425963	50.0990623	165.9506978	19.93358041							
344	74.06012028		95.50348363				18.27349852							
345	81.51770389	143.8423197	106.6096633	57.03908216	46.87167489	177.7702184	23.42502442							
346	82.64391743	146.214546	110.5805266	43.05677825	45.83808416	176.3470109	19.53311466							
347	72.35851369	121.9675916	87.90686922	20.40122351	53.97285406	149.0459468	20.53785594							
348	76.90425068	136.992927	97.57019762	47.84430792	52.74928616	168.8949532	19.55821411							
349	74.6110752	141.7662001	96.16344119	59.73422063	48.01931991	169.9376467	18.72784175							
350	84.70537659	155.9801385	109.6071588	43.2130069	49.61464715	186.24438	20.94958565							
351	75.45157348	135.387804	96.90734808	47.12299043	53.846715	167.7732839	21.55609468							
352	77.21569323	137.3505665	104.915356	37.86445188	50.24989172	171.7407645	21.18646368							
353														
354	81.76588868	147.5345171	106.1035207	55.22075014	51.15134903	178.8331193	20.8507239							
355	6.493652961	11.87127065	9.198109	20.57583067	7.468577284	13.33648794	1.700260463							
356	64.25775085	99.3151309	73.96304612	16.21181874	38.28380456	128.1161901	17.89412094							
357	100.6900875	171.3613673	124.1409287	102.4370145	71.04352641	206.6639942	26.40054816							
358														
359	64.07085465		81.77812052											
360	61.67372696	87.6730717	79.78141022		43.05398205	118.7422032	20.63303614							
361	59.05347875	111.1861081	73.91040037	56.75385428	53.5964639	134.4567165	17.96229253							
362	58.78903941	95.97978711	75.54698993	32.37431762	47.24150425									
363	66.77477288	99.33922743	90.45564214	14.20313028	46.4733817									
364	62.0679127	98.27739125	80.29574044	31.42783703	46.93088903									
365	61.86255458		75.82675957				20.35801348							
366	56.4155145	80.32297398	75.14641432	15.30260992	39.71066743									
367	67.57106931	130.6495344	89.92655733	51.92489229	49.53066094									
368	64.2849164	112.0544612	85.95897531	41.07417794	46.63137167									
369	59.75137167	94.85402579	76.26567474	38.62054372	47.2221736	125.9365646	22.4577556							
370	60.39717347		75.24763899											
371	55.53652198	110.5788559	69.54124954	61.97526884	54.36479607									
372	63.40278125	110.7991118	77.49350469	56.35758086	51.09314147	137.0200671	20.03964553							
373	62.04284702	104.3985703	78.34626946	50.89832646	43.56510369									
374	57.0062171	111.8981319	75.88152524	52.86091723	48.30675629	140.9459795	20.45643126							
375	61.8640695	107.6109291	77.94950068	53.4032613		134.2963404	22.30470188							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
376							19.05762212							
377	58.24010407	104.2624625	71.6077159	45.75718039	49.45016162	131.8431378	19.69609482							
378	60.65368997	106.3593001	73.26409263	38.77972373	54.26269075	133.9208113	19.35130284							
379	65.70283296		86.83551476											
380	67.33460107	111.3489938	90.57806383	24.59421634	42.42795542	143.5186409	21.55019094							
381	71.1214877	118.3040401	94.66805324	25.46029081	52.5827798									
382	64.39612056	101.2796434	83.9670279	15.5958154	44.03504226	130.6887216	20.9290047							
383	58.52272985	100.6235018	76.77856139	27.99994048	48.63862528	128.5653261	20.64442935							
384	73.12657928	106.5001747	95.42078641	21.9919706	50.60278521	138.8382161	20.62342227							
385	67.56009304		87.23370959											
386														
387	62.66242541	104.9666808	80.7579192	37.86779278	47.98604662	133.2310604	20.43313882							
388	4.438198754	10.70301351	7.243008941	15.39589005	4.100578885	6.792772965	1.21173982							
389	55.53652198	80.32297398	69.54124954	14.20313028	39.71066743	118.7422032	17.96229253							
390	73.12657928	130.6495344	95.42078641	61.97526884	54.36479607	143.5186409	22.4577556							
391														
392	63.45986205	105.4981153	77.08285232	21.58193565	46.04301505	133.4208747	22.13090621							
393														
394														
395	60.47708121	103.3167218	80.32960021	35.43457034	49.15832337	130.2433442	18.05386724							
396	58.46270599	92.10115982	78.70871583	18.54059511	37.82891645									
397	62.02220862	110.1668398	77.9960955	37.87232694	48.73490422									
398	60.86815872	89.25556863	79.40965616	17.38035415	47.04931504	119.0664982	21.78912679							
399	63.75473928	106.852555	80.94597236	42.81865859	58.74590235	136.8248429	23.7986177							
400	66.62710458	112.8475215	88.06146811	58.85593213	50.5696133	142.189695	20.02195497							
401	64.78958181	108.1982969	84.72189171	53.43315714	44.26311937	135.7425485	20.78374546							
402	68.79840974	106.3246059	84.06679739	29.631952	48.42795024	130.8088442	18.49888208							
403	56.6325458	95.59360967	71.23144532	26.19567481	49.87418073	121.4253254	19.72945334							
404	62.3599125	115.941442	80.73188504	72.56929198	46.89694746	140.3717465	16.62414415							
405	63.6904187	113.5050517	85.81429377	40.09598922	48.2373661	142.2166144	22.90231316							
406														
407	62.66189408	104.9667907	80.75838948	37.8675365	47.98579614	133.2310334	20.43330111							
408	3.347634249	8.536351218	4.509530702	17.01588935	4.777544805	8.069485511	2.281380685							
409	56.6325458	89.25556863	71.23144532	17.38035415	37.82891645	119.0664982	16.62414415							
410	68.79840974	115.941442	88.06146811	72.56929198	58.74590235	142.2166144	23.7986177							
411														
412	72.02720212	123.6950634	96.31192602	27.31173507	50.53771184	153.4591439	20.09803069							
413														
414	72.02720212	123.6950634	96.31192602	27.31173507	50.53771184	153.4591439	20.09803069							
415														
416	72.02720212	123.6950634	96.31192602	27.31173507	50.53771184	153.4591439	20.09803069							
417	72.02720212	123.6950634	96.31192602	27.31173507	50.53771184	153.4591439	20.09803069							
418														
419	60.82701674	111.2362905	79.0430533	50.1536239	35.84460666	134.590995	18.0340906							
420	65.72434106	124.4524115	91.21073471	61.34216487	49.42172353	153.2210376	18.89198477							
421	78.26750852	125.2100482	98.96339105	36.60206269	57.39764064	149.9753583	17.36447089							
422	57.50935925	88.29550711	75.4880639	37.59984105	46.77866093	113.751313	19.36996246							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
423	68.65999848	112.567365	93.57803176	35.67647168	48.76940777	141.0633792	18.07694996							
424	67.39706538	118.7815248	91.15737288	36.5291822	51.87766341	145.9095735	18.02360008							
425	76.38434947	133.9617967	98.74426857	48.55164159	55.71630917	165.1055802	21.5413218							
426	79.63572405	138.1339958	104.0553337	37.51186862	49.46295425	166.4584801	19.47967919							
427	78.52048542	149.2964555			64.48033015	183.9375693	20.32569511							
428	73.87601138	146.2443141	98.04892501	43.31890766	60.27021676	177.6614135	18.82950033							
429	77.52332614	136.3727476	102.0394547	14.21897752	49.51936573	164.8028948	20.14592135							
430	70.95069029	120.5747442	93.49861209	18.23958132	45.11769077	148.5235945	20.68225766							
431	74.74378355	131.6232784	100.3454698	13.5660611	48.53740442	163.3221005	23.6414302							
432	72.71493447	129.181884	99.88501606	15.09889342	49.93858986	158.6091221	20.33004728							
433	69.5945549	108.9408138	95.85613423	20.61789493	49.43979476	139.0555483	20.72563761							
434	79.85866892	124.7665412	105.241467	18.96689727	43.74320209	151.7697189	20.93914356							
435	72.89569543	125.9339501	101.3026732	12.24623855	52.75719686	155.4441914	18.95296026							
436	80.23279496	121.565451	107.3146923	20.52245629	49.53040539	152.3739192	20.62772131							
437	73.78361165	123.5659832	101.826192	10.7899991	49.19131736	153.6391317	21.31729058							
438	71.81347752	117.9395704	100.2637519	21.23725846	50.73890832	154.870471	20.92937132							
439	70.97268153	118.0944596	95.6936598	21.29898089	49.11786548	148.0861204	21.47406885							
440	71.65596119	126.0161451	98.73118335	11.83071359	51.20570415	152.8728807	20.33496125							
441	68.80962947	112.4281447	90.47220555	13.31788719	49.4745943	143.6380653	19.11895369							
442	66.11300452	125.9463184	95.69072536	17.75935681	54.99077041	159.7489828	23.85880624							
443	79.12034802	127.667016	105.5868294	12.81740436	46.4854666	159.8521577	20.56005433							
444	72.41284212	134.4213038	98.73904864	43.17723198	58.10957658	165.9093888	20.47853338							
445	69.70748004	116.6165686	96.77277574	40.00484321	45.52897719	147.5463951								
446	67.04637138	113.626874	90.02536803	24.41615913	51.61390633	145.1259691	18.58574935							
447														
448	72.02684699	123.6950537	96.65090497	27.31157776	50.53786607	153.4594769	20.09778383							
449	5.692840609	12.19136222	7.282218818	14.30666736	5.48970648	13.51909594	1.565888258							
450	57.50935925	88.29550711	75.4880639	10.7899991	35.84460666	113.751313	17.36447089							
451	80.23279496	149.2964555	107.3146923	61.34216487	64.48033015	183.9375693	23.85880624							
452														
453	74.89433847	122.4075964	104.7542837		47.47360419	151.4669678	22.03403469							
454	72.31136586	130.9755317	99.78393567		49.04774184	163.200027	22.93943003							
455	76.96822192	124.5281848	97.84201535	29.63746289	58.30426529	158.5279942	19.69345905							
456														
457	74.72464208	125.9704376	100.7934116	29.63746289	51.60853711	157.731663	21.55564126							
458	2.333061237	4.462336695	3.564988737		5.851842382	5.90692617	1.675030479							
459	72.31136586	122.4075964	97.84201535	29.63746289	47.47360419	151.4669678	19.69345905							
460	76.96822192	130.9755317	104.7542837	29.63746289	58.30426529	163.200027	22.93943003							
461														
462	70.71784034	127.5441559	94.19002229	41.27092549	51.58520953	161.4724339	20.14201529							
463	74.55751986	131.7361019	100.2403936	49.80191858	61.24695837	168.0045388	21.72134175							
464	76.35996517	128.1073654	101.620233	64.6946448	54.7977429	156.9871434	17.49185057							
465	78.0449301	126.4017222	106.2115387	19.97964402	55.39375576	161.4931881	20.78756437							
466	80.38392721	144.4609237	108.4756144	51.71967333	58.39609241	185.2109556	28.45113002							
467	86.24242638	150.6208712	111.7698709	48.01337337	56.81111872									
468	70.27624616	120.2604518	96.83864414		51.91932822	153.4407087	20.72054305							
469	70.35028943	125.3174357	94.78301672	28.43172927	51.01491004	162.4344206	20.45011908							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
470	78.97862357		104.2323484											
471	83.84928245	145.7185106	112.1760826	38.10324548	46.84981162	178.7050365	19.59164622							
472	83.06586483	128.555377	108.1621768	19.21621638	46.27939994	160.3390302	21.26067336							
473	69.0637416	118.1132282	95.08069183	25.68537794	50.13479333	151.7972846	21.20365057							
474	74.51330215	119.6742951	102.9680418	15.556588	50.92996062	132.2031941								
475	76.66381891	121.4350627	103.7010568	17.45630725	47.86805856	156.088562	21.00919883							
476	66.55659371	117.3287635	92.96747132	11.66935713	49.6901998	150.2471124	22.20250287							
477	73.50588682		96.16726832				22.06206336							
478	67.60893681	100.67052	93.59301684	8.509171517	49.2027013	139.6176568	21.49986585							
479	70.53150212	121.103384	97.69032179	21.08876277	48.02360163	155.4352124	21.94725641							
480	74.57113008	127.2789018	99.3992212		49.93956229	161.4325462	24.04203542							
481	68.66034946	113.139271	95.60056099	12.98965554	48.88162727	146.537781	21.87351759							
482														
483	74.72510886	125.9703523	100.7933796	29.63666193	51.60915735	157.732165	21.55629262							
484	5.68187602	11.99623177	6.154817852	17.03526496	4.138736951	12.73424887	2.237169047							
485	66.55659371	100.67052	92.96747132	8.509171517	46.27939994	132.2031941	17.49185057							
486	86.24242638	150.6208712	112.1760826	64.6946448	61.24695837	185.2109556	28.45113002							
487														
488	111.8711008	209.3813878	145.9363064	52.29703325	57.60592791	248.0825777	26.55723419							
489	88.28646025	153.7003042	116.4638066	51.34090058	56.2673697									
490	89.05328847	174.641831	120.06489	86.34804312	56.78016401	208.5578917	26.58983777							
491	88.21677204	139.6224486	112.9040087	22.07751478	60.90346755	176.179053	25.03747546							
492	108.6127794	195.8481177	138.1039089	36.57537612	68.91779829	232.8933416	23.85733525							
493	86.61143852	158.2483325	113.3252021	33.76309747	54.66793212	196.0710661	24.19740691							
494	88.47471407	160.694142	116.0010645	44.69086431	58.91603039	196.2093499	24.35369511							
495	91.20607819	153.3454613	117.1735942	17.08126955	53.09247067	186.783534	22.3905752							
496	89.75946646	147.7866697	118.8541116	25.77574384	60.16095426	185.9049742	23.11425							
497	87.22424024	142.7134206	112.6177119	30.47840036	54.16868356	176.8388709	24.94349414							
498	92.05867174	136.8732988	117.3663226	26.13035267	54.72905852	172.0508613	23.87899598							
499	94.54071293	141.8904031	118.3712748	22.26731437	54.24292631	174.7694899	23.10795993							
500	91.81267362	143.0849859	116.3061858	17.44494025	53.5106322	177.1856728	24.112584							
501	89.08388601	140.7285095	114.5330741	22.56144222	53.02423672	171.7624312	22.732192							
502	94.01299526	147.2756366	118.0920657	16.47116718	51.00166629	178.8988549	20.27773951							
503	85.70907452	144.2766735	114.0176249	19.40861291	55.20047377	177.3147055	22.72610682							
504	91.75076394	150.4500852	117.6047577	23.98832949	56.64636149	182.4691292	23.48766757							
505	88.87925428	155.4660337	114.053719	49.5300855	56.77815738	186.3811968	22.2330967							
506	90.31669687	139.2812862	119.1984611	20.69909915	51.76793672	177.1148877	22.88804309							
507	88.79489678	135.5979958	113.4631033	19.46866844	51.33508436	167.6335501	22.65883285							
508	87.04967826	151.2364582	111.1524515	29.40280396	74.89271274	183.4998786	23.89897865							
509	86.83451439	142.1217185	110.5355742	20.9244818	67.85489691	176.1452251	23.81587453							
510	86.75405897	157.7115768	112.035575	18.25757601	73.92316242	189.7907663	24.3887616							
511	89.65361749	158.5776781	114.0216382	23.635143	75.15465238	189.5602515	25.0778899							
512	92.44793428	155.961732	115.470185	24.20199586	70.27382809	183.6007022	20.75742095							
513	89.09161446	161.6820354	111.4249666	26.50150105	72.90869024	193.897014	21.99318597							
514	92.74520374	151.8286813	120.9679637	27.73440712	58.21606235	184.9079235	21.34894397							
515	90.71135525	157.5175416	118.2538718	23.29002985	55.42024314	189.0534042	22.07732808							
516	88.41588678	147.6076907	113.8437348	34.03155645	53.00737841	176.5369561	23.28322855							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
517	85.08326697	129.1711644	110.8657524	20.02070572	52.49651325	164.135857	25.22879695							
518	93.68535452	144.1601634	120.7912355	16.94268317	55.47474541	176.5491106	23.0948182							
519	94.16974031	152.2582201	120.7026736	16.65380973	52.84094245	183.9340033	21.34288567							
520	87.77948968	137.0840813	114.9387669	22.12923998	54.56555512	174.4667602	22.42540656							
521	88.65642437	140.5540479	115.5106534	20.31342231	55.59617903	176.8673569	23.32659188							
522				23.8223418		181.4060866								
523	89.10597598	146.6100704	115.1739277	24.84791991	53.24902241	180.0561572	24.941091							
524	112.4534612	220.0935457	147.4522645	87.14490024	56.71725615	260.0658898	26.05578997							
525	87.13862385	167.0817549	111.5544381	40.43700392	58.93649789	201.5509524	23.41755766							
526	90.61596195	164.4042827	111.9409965	32.92752907	66.6496296	196.2975169	24.43793314							
527	86.00017876	159.954259	108.4386278	32.06074698	64.51782429	192.7810242	23.121222							
528	87.25785176	139.663396	113.0699169	25.69082922	52.66104085	174.2430235	23.20520511							
529	98.38414025	155.3725484	125.1434009	20.64322395	53.25815131	190.2634573	22.58362263							
530	87.39534647	159.1436766	106.7338469	32.88612744	68.56193911	191.5647948	22.21936937							
531	95.12701255	165.6602595	115.4192642	31.92193982	70.85181226	200.0790735	23.88851615							
532	88.39021017	151.3111445	106.3099444	20.47005015	63.72881293	184.0161393	22.17265436							
533	89.30116325	155.0562242	110.1729861	26.42714071	67.58985747	189.8518747	25.85189209							
534	85.66046029	155.8780781	103.8546428	37.09513492	63.74225512	188.8229996	22.84651809							
535	89.20899647	165.1559165	118.0847864	49.12152277	66.1519803	198.7723342	25.70009205							
536	88.80283408	160.387982	109.1432742	37.4503424	64.48648433	194.9698334	23.3155005							
537	92.46717645	166.7075806	113.602552	41.46647889	62.30033118	196.3961537	21.69244705							
538	90.50613699	159.0559563	117.4321005	29.59654128		193.9872218	24.07732186							
539	93.67218522	145.7669263	119.0079333	23.62191069	53.86826484	178.0634739	23.9747645							
540	89.86095624	146.9135762	115.7988337	24.99132257	55.59159394	183.7841761	24.54344212							
541	90.32257091	159.9746806	81.03742305	32.78952464	57.92108706	175.2412123	23.2290622							
542	90.7008389	156.7832475	118.0383026	35.28863387	53.24296967	191.8483718	24.04456055							
543	86.03003964	142.7435505	111.5651267	34.40320426	54.18962626	177.3110798	23.40811283							
544	90.42965531	150.6202846	118.3956042	55.28201412	53.74346913	186.7587962	21.05412916							
545	86.21387522	139.5306512	111.7455258	44.93219621	54.84813939	174.8283909	25.24562865							
546		145.2506813		32.21712521	55.48725593	180.2206155	24.9400786							
547	82.04917703	137.9666883	108.1755343	38.8184976	54.73423746	174.8967627	23.27775206							
548	79.43269131	129.540067	106.488361	42.28645929	56.22628221	163.4912333	23.98996973							
549	83.45261419	138.3156178	105.3086561	27.05757368	56.01561726	170.0813095	22.91357429							
550	86.57703222	145.3940324	112.1453766	38.06349637	56.45027621	179.0834657	20.07832432							
551	84.02774864	135.9543105	107.0454285	24.26423336	56.57630246	165.4486158	23.20528364							
552	83.5395803	139.0827148	105.9386831	37.36095106	53.74186725	169.1417472	21.74178285							
553	80.10701679	127.176449	104.0698928	31.388862	55.64149123	160.9509262	23.28211278							
554	81.30891843	144.0351887	104.8696179	40.00561969	54.4600923	177.6899464	21.98772236							
555	89.35144042	147.6742478	114.222572	48.21850145	53.72337722	178.9780178	24.38801491							
556	85.60756347	156.1086114	112.6922753	40.89649673	57.63759092	189.0731253	21.56152845							
557	79.78331881	140.3936338	106.6861247	32.51315794	55.51851923	174.8364363	23.31028314							
558	89.60963298	157.0690344	114.793352	43.23177357	54.48313401	191.6802025	22.87366135							
559	88.53982206	134.606609	111.9321618	46.84070866	53.56302956	169.7312375	22.26860475							
560	106.7484122	172.8936247	135.7488457	66.04309495	57.43573023	210.014393	21.10226904							
561	83.73854252	145.0234622	109.7788046	41.45197266	62.92786311	179.5418464	23.24440817							
562	86.60638294	149.3669096	111.178987	38.50191868	55.10497103	181.0470094	21.45289481							
563	80.58612474	140.6359522	106.4283451	46.3106258	52.15118703	174.2981403	23.3023068							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
564	86.12639967	133.3949597	112.424748	27.06200986	53.15700857	167.5410305	22.61766626							
565	83.91071124	149.5420825	108.2404427	35.45144514	54.99125697	183.1624616	22.95050614							
566	95.09377966	149.5251865	120.5706232	45.10744465	54.63354682	182.0193658	22.31655997							
567	91.94015774	162.3398245	118.699421	54.42665669	55.43794014	197.8274841	22.48803861							
568	87.40439144	138.6752287	115.2995514	54.90160422	52.30421256	175.1170477	25.48841582							
569	88.48053024	152.3497773	115.2550961	53.5858113	53.65345605	188.7117839	23.1802165							
570	86.42743854	156.3408634	111.1042321	53.1361017	53.15684901	191.9066795	23.76954226							
571	93.44507289	145.2949811	120.1115263	20.87645605	56.22946823	179.6518726	24.83692977							
572	84.74446763	146.5614935	110.2979943	41.04090844	54.69541837	179.7045275	23.76105038							
573	83.09494718	149.1298593	110.5811722	46.45151535	63.65023547	183.601465	24.08799151							
574	87.62538538	152.2401687	111.2280889	38.86607693	69.9559009	185.0741939	22.94347116							
575	88.55928478	154.2164695	110.7265617	27.89118664	70.44128663	185.6670299	22.27582385							
576	85.97202347	153.8022726	110.4611631	51.04162868	68.35020935	186.2232156	24.01112095							
577	89.53107571	160.6216997	112.8389553	37.46561872	64.11495256	191.8241508	22.73194616							
578	91.43050715	146.6048667	111.3658893	24.26833154	68.25063653	175.7695314	20.84774426							
579	88.16651885	146.4448921	111.4376921	27.16371835	71.71072066	178.023705	23.17075152							
580	81.73348053	145.4920959	103.0997646	26.58268589	67.09321177	175.4476658	23.42962695							
581	94.68817245	151.98583	118.5376767	38.58745231	50.51274371	185.3026683	23.64730308							
582	88.14557149	155.8871956	113.9775628	42.49878741	55.2026086	188.8932297	24.30602867							
583	88.43322949	139.1968588	112.4346539	34.7674455	51.8067184	171.2628817	22.28603255							
584	112.7183268	187.548844	146.3845638	52.26324991	61.28992853	229.2888456	26.87066867							
585	86.4708013	141.2228442	110.846501	30.39892357	56.50622845	173.3070979	24.30162893							
586	86.77535476	141.6676957	112.3807871	28.33743092	52.74529844	176.3638489	23.86347874							
587	95.22864979	151.3342934	125.7790947	11.54889261	54.26876586	190.8066774	25.59551534							
588	90.00897678	154.4652414	118.8040698	17.86606173	54.42147063	188.2865494	20.81232705							
589	90.58066436	150.0515013	117.3055953	14.37382181	54.61113097	184.3905667	22.13997946							
590	88.48966964	146.7874968	115.9677563	25.35687445	53.63588618	178.7480911	23.26266317							
591	97.19524944	163.765279	128.3401094	14.74708386	58.29326845	202.6933223	26.42112138							
592	89.89492205	149.8954368	116.1629201	19.52135077	54.64609982	182.1766618	21.9363516							
593	85.11805934	153.1701466	113.5990962	34.96961964	56.68711953	187.7720537	22.78175665							
594	91.60746851	144.2070639	117.2139685	37.33064134	53.12134049	179.2799389	23.38629416							
595	112.3936452	181.9176669	137.8380218	24.83808877	51.79291633	220.9316308	26.86553264							
596	91.68946043	150.9355355	115.7492352	41.16843492	52.76265521	184.2842327	24.71527917							
597	84.68484828	152.5464505	114.708624	26.66341786	54.94607309	188.733855	24.27265717							
598	95.26955824	170.1532793	121.7831188	20.32218795	54.52213688	203.8355272	24.8126003							
599														
600	89.80316124	151.8913875	115.0746904	33.37032636	58.02411435	185.5712964	23.41592899							
601	6.305667766	14.25285835	8.672281193	13.44016616	6.207450236	15.25761981	1.424181079							
602	79.43269131	127.176449	81.03742305	11.54889261	50.51274371	160.9509262	20.07832432							
603	112.7183268	220.0935457	147.4522645	87.14490024	75.15465238	260.0658898	26.87066867							
604														
605	83.36938163	160.9413815	114.2520231	51.7867492	53.57337627	198.4413748	23.57056485							
606	90.6515154	166.9315482	118.4668376	49.51610267	58.35821754	201.8719542	25.74579703							
607	90.76675523	162.4389887	117.1384146	44.55825344	53.61980804	192.2432047	20.71280534							
608	89.72822446	155.4426879	117.2855745	25.11309159	60.15516501	190.2082673	26.12534559							
609	92.74358904	158.8596008	118.266668	25.49078463	63.25374076	194.6993087	21.9635406							
610	91.90606018	155.9911087	116.6358688	9.060784662	66.33937996	190.9419174	23.66530329							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
611	85.6139001	164.9171805	112.2886507	21.50532755	67.17359753	196.78496	25.01194683							
612	94.64867009	136.4528808	118.1077117	7.2823584	55.44363844	170.2678232	22.6592912							
613	87.36250549	145.0058194	110.4553705	29.53218488	52.91153831	174.2634264	21.01949907							
614	84.25622583	140.0732068	106.828677	18.99792797	61.43969992	172.1453428	23.64450132							
615	81.89454193	125.901752	106.4695847	14.93611356	54.04321937	157.0155485	23.33453508							
616	97.50624969	153.4252038	124.8229247	11.34000996	59.0216554	185.3158104	24.08831001							
617	92.40026739	143.3191027	117.7841204	4.403849536	56.34090458	177.9569977	23.60219729							
618	94.30008129	142.2788491	116.0599147	15.50823701	61.00299199	174.4100997	23.28425353							
619	98.54394502	161.8588778	127.9281421	18.38662415	56.64077134	198.4132135	23.76542561							
620	86.11149234	135.2452094	107.0673364	32.53412755	73.7226124	165.7565124	20.3111282							
621	82.55298203	144.7614657	102.1225672	7.042813575	77.19772555	178.8184371	24.42317072							
622	83.89209922	136.1973144	106.4882352	26.68350212	70.99162867	167.8545003	23.73818199							
623	92.74358904	158.8596008	118.266668	25.49078463	63.25374076	194.6993087	21.9635406							
624	86.68110027	166.1719423	106.8290541	30.44339345	65.48610578	194.5118313	22.5840473							
625	93.45347289	152.7426281	116.2682925	26.79025668	56.57364252	183.5349778	22.71258265							
626	103.0576362	168.3769402	130.5167195	29.52463059	58.092959	206.1525575	24.6861098							
627	90.53643509	157.3101489	119.2872021	20.69397429	55.877036	193.2274818	22.80961299							
628	93.8864732	154.0250188	122.7572659	19.59481876	62.61764548									
629	89.21296593	134.0314299	111.9284334	20.66917692	55.89792207	168.0914658	22.12435486							
630	105.2604987	160.7212123				192.748166	22.16728057							
631	100.0711951	161.2470594	127.8625676	30.75971699	52.3356662	198.1896958	22.19230274							
632	90.52866902	157.3926948	117.3978905	37.19570154	56.90640592	189.1322167	22.76181077							
633	100.4434672	157.8482906	128.6446364	46.21433847	50.63475388	193.7134667	20.3482034							
634	92.4071742	155.7464529	122.6420271	70.77532823	51.26136678	189.0687984	22.27317785							
635	90.01006541	150.1708097	117.7962163	49.92592464	53.24166395	186.3531043	25.0421072							
636	89.26563401	152.8364899	119.9351499	60.96561019	51.46404143	190.1105363	23.24932857							
637	90.35587489	159.9205636	115.075076		52.57862803	189.8948468	20.73865917							
638	81.96045814	156.5772308	108.2197651	66.80043887	56.35554273	193.2533916	24.96504886							
639	105.3861033	174.1569225	131.3355985	58.05470553	58.50686659									
640	95.18268988	163.5074832	121.0149517	48.21657857	53.69914058	200.1078342	24.12014253							
641	85.61956701	160.5745571	111.9029921	55.08939266	52.50851465	192.2243484	24.23680138							
642	67.21429055	102.3263115	86.59767622	8.169680626	51.91785075	133.9082917	21.43539597							
643	87.09644203	165.5123993	109.0333751	28.17896113	73.81203319	199.9030118	24.31250056							
644	80.34364078	149.8289685	101.7786104	32.1599471	65.1664724	182.4741048	21.45160973							
645	85.65406304	153.6230883	105.5829643	42.79805643	65.8835417	184.0711623	23.48105201							
646	88.86307914	161.784586	114.97912	22.24416968	62.04784789	201.6995096	25.31420949							
647	77.29145454	142.396211	93.91682085	15.30518051	62.41345897	177.5840802	23.86333334							
648	84.77728894	153.1022153	108.1757664	22.04224755	66.66054223	190.6769174	21.61043806							
649	86.1590475	134.7163253	108.6388907	50.12457752	64.27464392	162.3751179	20.87303404							
650	85.4881594	152.2442474	98.33956396	15.85276784	55.5305196	185.8002354	21.70713676							
651	94.15801051	147.9554034	117.0927323	68.19785433	57.32195096	181.1382601	22.76609349							
652	84.65731512	139.0164833	107.5362753	33.12861537	56.21125423	171.6661422	24.09257824							
653				17.51320411	52.59236145	185.669801	22.03470442							
654	94.06295386	152.8583858	123.221756	45.93390514	56.30980102	183.3385196	21.95324166							
655	90.91444336	159.726497	119.2725317	27.34443886	54.88521912	198.97565	24.33610681							
656	94.16273223	152.2088374	121.9556719	14.11687101	55.56850132	186.1508869	24.59225135							
657	94.99581049	154.349101	125.1114944	54.72574637	53.30574925	187.1399214	24.8205601							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
658	88.94412084	151.3783153	116.7938628	48.83773384	58.85195562	188.7808393	24.47961022							
659	95.79905032	170.161066	124.7561848	62.22842324	54.27184521	207.9049832	24.83153539							
660	88.92813455	157.6736268	118.4867388	46.04689128	56.71792873	192.5839658	24.63381439							
661	95.93704976	143.6126184	122.0229522	49.8481548	54.84168875	175.8567037	22.47617349							
662	85.89656285	138.2480119	112.02493	46.41911972	51.17345453	171.5621522	23.41193564							
663	90.61102618	154.8235156	112.9907748	36.36656078	66.35448414	184.8295077	22.13355567							
664	92.94597907	152.7568564	117.4761702	50.70963287	53.36739198	190.6720015	22.56802918							
665	87.5234876	147.3849335	112.041953	51.23413548	54.34393984	180.4232162	22.1105213							
666	79.09081428	159.3710676	102.3444157	50.69958834	66.69495322	194.6485979	22.03929135							
667	78.85842251	144.2504921	102.163124	32.95099699	70.3863116	175.3382961	23.50264922							
668	92.4493718	156.9286013	120.1858567	35.10623634	69.21543702	190.2537929	23.3950487							
669	81.94198265	135.5062334	105.1389248	24.40324318	69.33146257	165.8738282	24.19189098							
670	92.16997073	152.0370999	116.571431	75.44237734	53.64774354	190.9838733	26.48852337							
671	85.8428469	165.1115201	109.2740117	42.59403003	63.0414913	197.9008083	22.37925444							
672	75.89095228	146.246791	98.29424759	46.94114993	66.1685895	176.6168417	22.28055383							
673	79.45399189	155.6248521	103.9504355	46.15883349	67.51136003	189.8136699	23.03130654							
674	81.88202074	145.0151684	105.4701524	51.08272135	64.27629645	176.8986578	23.04503762							
675	94.62790386	158.5191948	119.340601	46.82538185	52.00296608	193.6959916	24.3513554							
676	91.0018404	160.330338	115.6303131	49.24412494	58.929477	195.7043487	25.03720926							
677	86.77192018	144.3267447	111.6734779	45.14096707	50.81722222	178.5722062	24.84496644							
678	96.41436575	165.2904722	124.6411027	48.16096051	58.89717294	195.883145	21.44589055							
679	91.84963366	135.9241901	117.7860395	40.94318037	54.31331075	171.4373974	24.15380669							
680	69.57052497	103.3149918	91.37658055	41.29755196	50.50953375	131.4743103	20.82802175							
681	95.27405785	164.7596961	117.0189834	55.9808009	67.00235155	195.6854838	24.98320696							
682	91.76086368	163.6018674	125.9907566	57.65621947	60.36164152	194.1600181	21.63354555							
683	90.91626498	140.4966623	114.5772034	15.36088581	54.65167169	174.1263521	22.65776248							
684	99.21600941	154.8419871	123.8859182	10.10781434	57.30838945	192.7869316	25.0231048							
685	94.04143686	149.7929931	119.8362402	21.07108346	52.32319613	184.9370702	24.15626388							
686	85.09833069	140.1776245	110.5853003	17.3364723	49.56347882	178.0172564	24.14565659							
687	90.97765586	137.068173	113.1476771	21.10618726	52.35864292	172.2778142	24.69131146							
688	86.03266971	147.2382157	110.1360082	18.9614394	49.57805973	180.729414	22.18173179							
689	83.34401857	147.0014063	107.7704253	25.61774125	51.91717176	178.3756908	24.07951179							
690	92.37612435	160.6199697	120.5928457	21.55736827	53.83581627	195.4323944	24.69845812							
691	94.19146355	163.2679848	121.8365019	17.27588179	54.31900686	199.3800925	23.86500942							
692	95.33209965	168.4682789	125.0419919	26.19981951	56.90135664	201.9196952	24.89736052							
693	90.74369844	148.6392389	114.4720748	12.90856231	56.76307651	182.6068774	24.21128979							
694	105.9209441	176.8273403	134.3620662	28.06479009	62.96647979	211.8013533	24.9555393							
695	95.71277104	162.0515661	122.8800337	24.48243519	58.60539431	197.8422539	24.40145987							
696	89.62056123	144.1124244	114.882204	30.52989578	51.07372669	183.0760679	24.46351582							
697	90.01371107	146.4428915	112.7267874	22.6922346	53.33787878	175.7138225	22.91993199							
698	90.76672788	141.3906252	119.1674938	14.95364825	52.2140905	171.6026201	21.93776417							
699	84.67875255	135.624462	111.4165484	21.36175417	57.62822201	168.0544754	23.36708028							
700	93.40991193	147.6385093	122.9921681	15.1920869	54.54917272	182.3443568	22.85823779							
701	90.44595287	152.0951745	115.6090534	18.73564329	52.37392179	184.848597	23.56229586							
702	91.22411347	163.0116662	116.9776251	31.60126227	61.25116793	200.8135445	24.64132168							
703	94.19583349	158.8954563	123.1594713	39.92176379	59.05402384	198.6468202	26.33249951							
704	87.92416904	152.8531368	114.7689189	19.58349931	56.01851237	188.5639752	24.0447474							

	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
752	84.2998259	145.3208787	108.853896	42.97815129	54.46634383	175.4091135	25.40086271							
753	10.06039889	18.23391108	12.85700647	20.83475428	8.074772875	28.52872692	20.18204748							
754	55.53652198	80.32297398	68.23213363	4.403849536	16.06240811	42.4471663	16.62414415							
755	115.4814691	220.0935457	149.7812481	118.7264037	77.19772555	260.0658898	167.5811366							

University of Cape Town

	BE
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	
43	
44	
45	
46	

University of Cape Town

	BE
47	
48	
49	
50	
51	
52	
53	
54	
55	
56	
57	
58	
59	
60	
61	
62	
63	
64	
65	
66	
67	
68	
69	
70	
71	
72	
73	
74	
75	
76	
77	
78	
79	
80	
81	
82	
83	
84	
85	
86	
87	
88	
89	
90	
91	
92	
93	

University of Cape Town

	BE
94	
95	
96	
97	
98	
99	
100	
101	
102	
103	
104	
105	
106	
107	
108	
109	
110	
111	
112	
113	
114	
115	
116	
117	
118	
119	
120	
121	
122	
123	
124	
125	
126	
127	
128	
129	
130	
131	
132	
133	
134	
135	
136	
137	
138	
139	
140	

University of Cape Town

	BE
141	
142	
143	
144	
145	
146	
147	
148	
149	
150	
151	
152	
153	
154	
155	
156	
157	
158	
159	
160	
161	
162	
163	
164	
165	
166	
167	
168	
169	
170	
171	
172	
173	
174	
175	
176	
177	
178	
179	
180	
181	
182	
183	
184	
185	
186	
187	

University of Cape Town

	BE
188	
189	
190	
191	
192	
193	
194	
195	
196	
197	
198	
199	
200	
201	
202	
203	
204	
205	
206	
207	
208	
209	
210	
211	
212	
213	
214	
215	
216	
217	
218	
219	
220	
221	
222	
223	
224	
225	
226	
227	
228	
229	
230	
231	
232	
233	
234	

University of Cape Town

	BE
235	
236	
237	
238	
239	
240	
241	
242	
243	
244	
245	
246	
247	
248	
249	
250	
251	
252	
253	
254	
255	
256	
257	
258	
259	
260	
261	
262	
263	
264	
265	
266	
267	
268	
269	
270	
271	
272	
273	
274	
275	
276	
277	
278	
279	
280	
281	

University of Cape Town

	BE
282	
283	
284	
285	
286	
287	
288	
289	
290	
291	
292	
293	
294	
295	
296	
297	
298	
299	
300	
301	
302	
303	
304	
305	
306	
307	
308	
309	
310	
311	
312	
313	
314	
315	
316	
317	
318	
319	
320	
321	
322	
323	
324	
325	
326	
327	
328	

University of Cape Town

	BE
329	
330	
331	
332	
333	
334	
335	
336	
337	
338	
339	
340	
341	
342	
343	
344	
345	
346	
347	
348	
349	
350	
351	
352	
353	
354	
355	
356	
357	
358	
359	
360	
361	
362	
363	
364	
365	
366	
367	
368	
369	
370	
371	
372	
373	
374	
375	

University of Cape Town

	BE
376	
377	
378	
379	
380	
381	
382	
383	
384	
385	
386	
387	
388	
389	
390	
391	
392	
393	
394	
395	
396	
397	
398	
399	
400	
401	
402	
403	
404	
405	
406	
407	
408	
409	
410	
411	
412	
413	
414	
415	
416	
417	
418	
419	
420	
421	
422	

University of Cape Town

	BE
423	
424	
425	
426	
427	
428	
429	
430	
431	
432	
433	
434	
435	
436	
437	
438	
439	
440	
441	
442	
443	
444	
445	
446	
447	
448	
449	
450	
451	
452	
453	
454	
455	
456	
457	
458	
459	
460	
461	
462	
463	
464	
465	
466	
467	
468	
469	

University of Cape Town

	BE
470	
471	
472	
473	
474	
475	
476	
477	
478	
479	
480	
481	
482	
483	
484	
485	
486	
487	
488	
489	
490	
491	
492	
493	
494	
495	
496	
497	
498	
499	
500	
501	
502	
503	
504	
505	
506	
507	
508	
509	
510	
511	
512	
513	
514	
515	
516	

University of Cape Town

	BE
517	
518	
519	
520	
521	
522	
523	
524	
525	
526	
527	
528	
529	
530	
531	
532	
533	
534	
535	
536	
537	
538	
539	
540	
541	
542	
543	
544	
545	
546	
547	
548	
549	
550	
551	
552	
553	
554	
555	
556	
557	
558	
559	
560	
561	
562	
563	

University of Cape Town

	BE
564	
565	
566	
567	
568	
569	
570	
571	
572	
573	
574	
575	
576	
577	
578	
579	
580	
581	
582	
583	
584	
585	
586	
587	
588	
589	
590	
591	
592	
593	
594	
595	
596	
597	
598	
599	
600	
601	
602	
603	
604	
605	
606	
607	
608	
609	
610	

University of Cape Town

	BE
611	
612	
613	
614	
615	
616	
617	
618	
619	
620	
621	
622	
623	
624	
625	
626	
627	
628	
629	
630	
631	
632	
633	
634	
635	
636	
637	
638	
639	
640	
641	
642	
643	
644	
645	
646	
647	
648	
649	
650	
651	
652	
653	
654	
655	
656	
657	

University of Cape Town

	BE
658	
659	
660	
661	
662	
663	
664	
665	
666	
667	
668	
669	
670	
671	
672	
673	
674	
675	
676	
677	
678	
679	
680	
681	
682	
683	
684	
685	
686	
687	
688	
689	
690	
691	
692	
693	
694	
695	
696	
697	
698	
699	
700	
701	
702	
703	
704	

University of Cape Town

	BE
705	
706	
707	
708	
709	
710	
711	
712	
713	
714	
715	
716	
717	
718	
719	
720	
721	
722	
723	
724	
725	
726	
727	
728	
729	
730	
731	
732	
733	
734	
735	
736	
737	
738	
739	
740	
741	
742	
743	
744	
745	
746	
747	
748	
749	
750	
751	

University of Cape Town

	BE
752	
753	
754	
755	

University of Cape Town