

Name:

1. [5 points] If the mean weight of adult men is 170 lb. with an SD of 15 lb. Then according to the empirical rule s, the proportion of adult males that weigh between 140 lb. and 200 lb. is approximately (Assuming the population is Bell shaped)

- (a) 90% (b) 68% (c) 99.99% (d) 95%

2. [5 points] The standard deviation is

- (a) a measurement of center; (b) a measure of skewness;
(c) a measure of variation; (d) none of the above.

3. [5 points] Suppose the mean and median of a sample are 2.3 and 3.8. Then

- (a) the sample is skewed to the left; (b) the sample is symmetric;
(c) the sample is skewed to the right; (d) None of the above.

4. [5 points] Which of the following statements is **wrong**?

- (a) the variance is always the square of the standard deviation;
- (b) for bell shaped data, approximately 95% of the data is contained within 3 standard deviations of the mean;
- (c) at least 90% of the sample is always contained within 3 standard deviations of its mean;
- (d) the standard deviation can never be negative.

5 [5 points] A population is, by definition

- (a) a collection of many random numbers;
- (b) part of a sample;
- (c) the result of some experiments;
- (d) none of the above.

6 [5 points] A sample consists of 10 identical values. The standard deviation of the sample must be

- (a) -1.5;
- (b) can not be determined;
- (c) 0.303;
- (d) 0.

7. Suppose that you are working on a survey on campus, and that the goal of it is to estimate the proportion of students at UK that approve of a 15% tuition increase.

a) [5 points] What is the population for this survey?

- (i) All students at UK.
- (ii) The number of students who approve of an 15% tuition increase.
- (iii) All American college students.
- (iv) The students who finally participate in the study.

b) [5 points] Which method of sampling would be (statistically) best for this survey:

- (i) an on-line poll posted on the internet by the *Kernel*,
- (ii) interview based on a simple random sample drawn from the UK student population
- (iii) a toll free number phone-in poll
- (iv) use several ballot boxes placed on campus

c) [5 points] If you also want to estimate the proportions by class (freshman, sophomore, senior etc.), what type of sampling method will be the best to obtain that information?

- (i) simple random sampling
- (ii) stratified random sampling
- (iii) systematic sampling
- (iv) cluster sampling

2. A survey among UK students asked “How often do you read the Kentucky Kernel?” The possible responses were (“every day or almost every day”, “a few times a week”, “about once a week”, “less than once a week”, “never or almost never”), and the counts in those categories were (47, 59, 12, 14, 21).

a) [5 points] Identify the median response, if possible.

b) [5 points] Calculate the mean response, if possible.

4. Consider the following sample drawn from some population:

2 7 4 19 7 3 8 12 6 25

a) [5 points] Find the five number summary (min, Q_1 , median, Q_3 , and max).

b) [5 points] Sketch a box plot for this data with an appropriate scale for reference.

5. [15 points] Calculate the sample mean, sample variance, and sample standard deviation for the following observations.

-2 -2 -2 0 8 6 15

Sample mean =

Sample variance =

Sample standard deviation =

6. [15 points] Flip a fair coin three times and we have list all possible outcomes below:

Sample space = { HHH, HHT, HTH, HTT, THH, THT, TTH, TTT }

Assume equally likely probability assignments.

Define events A= {at most 2 Hs in three flip}

 B = {no H in three flip}

(i) P(A) =

(ii) P(B) =

(iii) P(2 or more H in three flip) =

11. (5%) A recent poll conducted by a News paper interviewed 1355 registered voters within Kentucky. A simple random sampling plan was used. The question asked was about the upcoming presidential race.

Based on the poll, the Newspaper published several results which include “34% will vote for Clinton”. This number, 34% , is

- (i) A statistic
- (ii) A parameter
- (iii) A standard deviation
- (iv) A margin of error

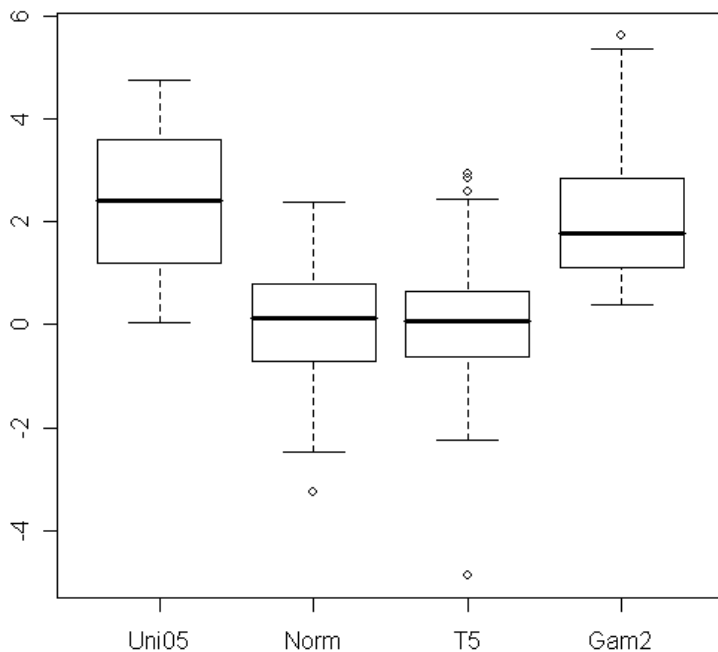
12. (5%) The population of this survey is _____ and the sample is _____.

- (i) All registered voters of Kentucky; those within 1355 that will vote for Clinton
- (ii) All registered voters of Kentucky; those 1355 voters interviewed.
- (iii) Those 1355 interviewed; those within 1355 that will vote for Clinton.
- (iv) Those 1355 interviewed; all registered voters of Kentucky.

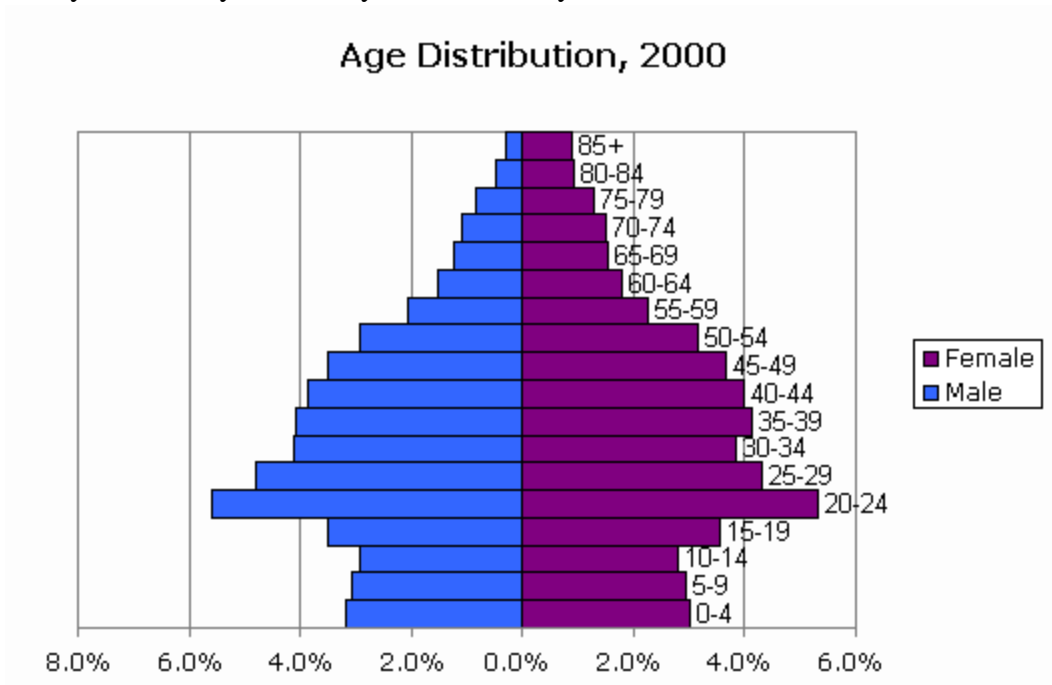
13. (5%) Given the following boxplot for 4 different groups, we can infer that

The Q1, median and Q3 of the group “Norm” is about

- (i) 1; 2.5 and 3.5.
- (ii) -0.8; 0 and 0.8.
- (iii) -3; 0 and 2.2.
- (iv) 0.8; 0 and 5.5



The next few questions pertain to the following histogram plot. It displays the age distribution of population in Fayette County, Kentucky, based on the year 2000 census.



7. [5 points] From the histogram, about how many percentage of the Fayette county population were between 0 to 4 years old (including both boys and girls)?

- (a) 3%; (b) 6%; (c) 4%; (d) 13,000.

8. [5 points] From the plot, determine about how many percentage of the Fayette County population were 20 to 24 year old female in 2000.

- (a) 5.5% (b) 3.8% (c) 17% (d) 20 to 24%

9. [5 points] For the age group 70 to 74, we can infer from the plot that

- (a) there were more males in this age group than the female
- (b) there were more females in this age group than male group
- (c) males and females are approximately equally numbered for this age group.
- (d) They account for about 3.5% of the population.