

Name: _____

Directions: This exam contains seven problems worth a total of 100 points. For each computational problem, you must first write the formula to be used and present all your subsequent work in order to receive full or partial credit. Circle your final answers.

1. Shown below is the five-number summary for a data set on “number of credits carried in a semester” for a sample of 100 college students.

{6.0, 10.1, 12.0, 13.8, 18.0}

(a) Identify the 75th percentile value. (4 pts.)

(b) Compute the interquartile range. (4 pts.)

2. An experiment was conducted to examine the efficacy of a new anti-depressant. Each of 45 volunteers with depression was randomly assigned to one of the treatment conditions, which included “new anti-depressant,” “old anti-depressant,” and “placebo.” The researcher monitored the improvements over time. At the closure of the experiment, the researcher concluded that the new anti-depressant worked significantly better.

(a) Why did the researcher include the “placebo” condition in the experiment? (6 pts.)

(b) The researcher stated, “A *placebo effect* was observed during the experiment.” What did s/he mean? (6 pts.)

(c) The experiment was single-blind, what is required for it to be double-blind? (6 pts.)

3. For each of the following variables, determine whether the variable is categorical or quantitative. For quantitative variables, further determine whether they are discrete or continuous. (4 pts. ea.)

(a) Height of a tree (in meters) _____

(b) Number of chocolate chips in a cookie _____

(c) Color of a graduation regalia _____

(d) Rent for an apartment (in whole dollars) _____

4. Briefly, but clearly, describe an example of a study (with context) in which there is a potential response bias. (6 pts.)

5. Featured below are data on $X =$ price of a can of vegetable soup (in dollars) for a sample of seven items.

$$X: \{1.1, 0.9, 0.6, 1.5, 0.4, 0.8, 1.2\}$$

(a) Compute the sample mean and the sample standard deviation. Show your work. (12 pts.)

(b) Construct a stem-and-leaf plot for the data. Use a stem width of 1 and repeat each stem digit twice. Comment on the skewness of the distribution. (6 pts.)

Stem	Leaf

6. Fred claims that he sold his truck for \$5,500. Trucks like Fred's have a mean trade-in value of \$3,000 with a standard deviation of \$500. George claims that he sold his SUV for \$7,000. SUVs like George's have a mean trade-in value of \$4,500 with a standard deviation of \$1,000.
- (a) Should you believe that Fred actually sold his truck for \$5,500? Justify your answer. (8 pts.)
- (b) Should you believe that George actually sold his SUV for \$7,000? Justify your answer. (8 pts.)
7. A survey was conducted to estimate the percentage of the people who are against large corporate donations to political parties during a Presidential campaign. Of the 450 people surveyed, 240 stated that they were against large donations.
- (a) Compute the percentage of the people who are against large donations and its margin of error. (6 pts.)
- (b) Based on your answer in (a), can you conclude that the *majority* of the people are against large donations? Justify your answer. (6 pts.)
- (c) In order for the margin of error to be 2.5%, how many people must be surveyed? (6 pts.)