

Name: _____

Directions: This exam contains six 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. Consider the following data presented in a stem-and-leaf plot. The stem width is 1.

- (a) Give a five-number summary of these data.
Note: Q1 and Q3 can sometimes be difficult to compute, but it is straightforward in this case. (8 pts.)

Stem	Leaf
0	6
0	889
1	1
1	22
1	
1	
1	9

- (b) Take as given that the interquartile range (IQR) for these data is 0.4. Using this information, determine whether the largest value in the data is an outlier. (8 pts.)

- (c) For these data, compute the sample mean and the sample standard deviation. Show your work. (10 pts.)

2. 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) Number of students absent in a class _____

(b) Precipitation (in inches) in a city _____

(c) Color of a fabric in a car seat _____

(d) Number of visible scratches on a chalkboard _____

3. An economist conducted a survey study to estimate the percentage of the people who believed that the nation's economy would improve during the year 2009. Of the 2,500 people participated in the survey, 823 stated that they believed that the economy would improve.

(a) Compute the percentage of the people who believe that the economy will improve and its margin of error. (6 pts.)

(b) Based on your answer in (a), can you conclude that more than 30% of the people believe that the economy will improve? Justify your answer. (6 pts.)

(c) In order for the margin of error to be 1.25%, how many people must be surveyed? (6 pts.)

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

5. Quiz scores (on a scale of 0 to 100) in a geology class had a nearly bell-shaped distribution with a mean of 52 and a standard deviation of 13.
- (a) Find the range of scores in which the middle 68% (approximately) of the scores would fall. (8 pts.)

 - (b) One student in this geology class was told by her instructor that her z -score on the quiz was 1.23. What was her original quiz score? (8 pts.)
6. A study was conducted to examine the potential negative side-effect of using amalgam as a dental restorative material. In the study, a group of sheep was given amalgam fillings, another group of sheep was given resin fillings, and the last group of sheep was given no fillings. The study concluded that there was an increased risk of kidney failure for the amalgam-treatment group.
- (a) Is this study an experiment or an observational study? Explain why. (6 pts.)

 - (b) In this study, there was a control group, but no “placebo” treatment was implemented. Explain why it is unnecessary to use a placebo treatment in this study. (6 pts.)

 - (c) Why were sheep, instead of humans, used in this study? (6 pts.)