

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. Data were collected on income (in dollars) for a random sample of 500 residents in a city. The mean income was \$42,000 with a standard deviation of \$7,000. The data were positively skewed.
 - (a) Would the median income be higher or lower than \$42,000? Draw a simple diagram to explain why. (8 pts.)
 - (b) Compute the z -score for an income value of \$34,000. (6 pts.)
2. Briefly, but clearly, describe an example of a study where there is a potential non-response bias. (8 pts.)
3. Shown below are frequency data for a survey study investigating the perceived difficulty level of a chemistry course for two groups of students: those who had high levels of motivation to take the course and those who had low levels of motivation.

Motivation	Perceived difficulty	
	Difficult	Manageable
High	24	41
Low	20	13

For (a) and (b), use the available space on the bottom of this page.

- (a) Construct a comparative bar chart for the data that is most appropriate for this survey study. Label the axes clearly. (10 pts.)
- (b) For the high-motivation group of students, construct a pie chart. (6 pts.)

4. For each of the following, determine whether the data are categorical or numerical. For numerical data, further determine whether they are discrete or continuous. (4 pts. ea.)

- (a) Genders of newborn babies (male, female) _____
- (b) Relative humidities (low, medium, high) _____
- (c) Weights of 5-pound potato bags (in pounds) _____
- (d) Times to complete a quiz (in minutes) _____

5. Consider the data set $X: \{58, 61, 60, 59, 62\}$.

- (a) The sample mean and sample median are both 60. Why are the two values equal in this case? Give a short, clear answer. (8 pts.)

- (b) The sample standard deviation of the data is $s = 1.581$. Suppose that you add 10 to each data value. What would the resulting standard deviation be? No computation is necessary to answer this question. (8 pts.)

6. The stem-and-leaf display below shows scores on a doctoral comprehensive examination for a total of eight graduate students.

Stem	Leaf
6	7
7	1569
8	38
9	4

- (a) How would you describe the skewness of the score distribution? (6 pts.)

- (b) Compute the median score. (8 pts.)

- (c) Compute the sample mean and sample variance of the scores. (16 pts.)