Stat 1350, Quiz #1, Fall 2014   Name _____KEY_____

Instructions: Answer each question completely. Show all work for any computational questions.

1. Describe the difference between a response variable and an explanatory variable.

a response variable is the thing we think is being "caused" by the explanatory variable.
the response variable is like "y" and explantory is like "x"

2. How does a population differ from a sample?

The population is the larger set of things we want to learn about, and the sample is the smaller subset we are using to estimate the population values.

3. What is the difference between an observational study and an experiment?

an observation study observed organic behaviour and tries to infer relationships passively. an experiment manipulates the sample being studied.

4. How can data be biased? Give a specific example, and what can be done to combat bias in studies.

data is biased when it systematically misrepresents the population data. for instance, if one uses a voluntary response study, or a convenience sample instead of a simple random sample.

5. Suppose that there are 30 students in our class. Number them from 1-30. Use the random number string below to determine the first 5 students that will be chosen in a sample of the class.

27460 34957 46322 30247 97636 61008 86093 81351 17772 77679 06555 91984 23159 00176

27 03 23 02 10

6. What is the difference between a parameter and a statistic?

A parameter is a value associated w/ a population. A statistic is the corresponding value obtained from a sample

7. What is variability? Describe two sources of variability. How does it differ from bias?

One source of variability is randomness. Another can be a sampling error from small samples bias can be reduced or eliminated w/ good sampling. variability cannot be eliminated

8. What is the margin of error for a sample? How is it related to confidence in the data?

the margin of error is a way of saying there is a range of values the population parameter could be around our statistic. The width of the margin of error can changed depending on our confidence but typically 95%.

9. A sample of 500 people and 43% answered "yes" to a specific question. Use the quick method to find the margin of error on this value and write the resulting confidence interval (as an interval, not using ± signs).

$$\frac{1}{\sqrt{500}} = 0.0447 \approx .045 \text{ or } 4.5\%$$

$$43 - 4.5 = 38.5 \qquad (38.5, 47.5)\% \text{ or}$$
$$43 + 4.5 = 47.5 \qquad (0.385, 0.475)$$

10. If you take a sample of 2000 people from a population of 10,000 or 100 million, the margin of error is not affected. Why?

The margin of error depends only on the sample size not the population size