ESS 200 (Stapleton)   Name: _____

Inquiry/Experimental Design Practice Quiz

Suppose your experimental question is "do students get better test grades when the completion of homework is mandatory?"

1. If an experiment were conducted to answer this question, what would be the manipulated variable?

2. Provide a synonym for *manipulated variable*.

3. What is the responding variable in this experiment?

4. Provide a synonym for *responding variable*.

5. Certain types of variables should be controlled in this experiment. What do all of those variables have in common?

6. Give an example of one variable that should be controlled.

7. What types of variables should not be controlled in this experiment?

8. What would you need to do in order to have a good **sample size** for this experiment?

9. What is the purpose of having a very clear protocol for collecting data in an experiment?

Suppose your hypothesis is "the choice to make homework mandatory (or not) does have an effect on students' grades."

10. Is this a one-tailed or two-tailed hypothesis? Explain why.

11. In addition to the quote above, what other information should be added to your hypothesis?

12. As a student conducting this experiment, should you be concerned about the possibility of others suspecting that bias may have influenced the results? Why or why not?

13. What does it mean if an experiment has an "n of 50?"

14. What is the significance cutoff that is generally accepted in scientific investigations?

15. Suppose your statistical test results in p=0.10. Which of the following best explains what that 0.10 means?

     a. There is a 10% chance that your hypothesis is correct.
     b. There is a 100% chance that your hypothesis is correct.
     b. There is a 10% chance that there is a real difference between the two test groups.
     c. There is a 10% chance that there is no real difference between the two test groups.

16. Suppose you are given 20 car tires that all contain air at exactly 35psi of air pressure and 20 car tires that all contain air at exactly 70psi of air pressure. When you measure them with your pressure gauge, your gauge reads exactly 50psi for the first twenty and exactly 100psi for the other twenty. This means…
     a. Your gauge is precise and accurate
     b. Your gauge is precise, but not accurate
     c. Your gauge is accurate, but not precise
     d. Your gauge is neither accurate nor precise

17. If you were answering the question, "does outside air temperature affect tire pressure," would your pressure gauge (from the previous question) be suitable for use in this experiment? Explain why or why not.

18. Suppose Gertie is trying to answer the question "does gender determine the sports that we like?" Gertie asks 10 boys and 10 girls to each list their two favorite sports. Given Gertie's approach, why is it impossible to use either a T-Test or a Mann-Whitney test to answer the question?

19. Correlation and causation should not be confused. Think of a situation in which there is a correlation between two variables but it is unclear which variable is affecting the other. Identify the variables and describe two different ways in which this correlation could be interpreted.