

Name:

### 1-A Populations and Samples

1. Fill in each blank with  $\mu$ ,  $\bar{x}$ ,  $\sigma$ ,  $s$ ,  $p$ ,  $\hat{p}$ , or  $n$ . Use a subscript of  $_1$  for Brook Knoll and  $_2$  for Vine Hill.

Sam is comparing physical fitness of fifth grade boys at Brook Knoll versus Vine Hill. He finds that out of \_\_\_\_\_ = 25 Brook Knoll boys, the average time to run a lap was \_\_\_\_\_ = 98.1 seconds with standard deviation \_\_\_\_\_ = 14.8 seconds, while out of \_\_\_\_\_ = 28 Vine Hill boys the average time was \_\_\_\_\_ = 92.9 seconds with standard deviation \_\_\_\_\_ = 15.0 seconds. \_\_\_\_\_ = 56% of the Brook Knoll boys and \_\_\_\_\_ = 46% of the Vine Hill boys could do a pull-up.

2. Identify the following for Sam's study above.

a) the samples

b) the populations

3. How might using one class at Brook Knoll and one class at Vine Hill result in sampling bias?

### 1-B Measuring Data

4. For each of the following research questions, explain a clear, specific, and appropriate operational definition for the dependent variable, and identify its level of measurement.

a) Do freshmen have higher GPAs than juniors?

b) Are men more likely than women to stay in their hometown?

c) Do romantic relationships last longer for suburban high school students than for urban high school students?

### 1-C Research Designs

5. James is studying the effects of marijuana on academics on high school students. State what you would recommend for the following.

a) the independent variable and its levels

b) the dependent variable, operationally defined

6. Give a possible example of each of the following for his study.

a) a mediator variable that could explain how marijuana affects academics

b) a moderator variable that could be used to test this mediator variable

c) a main effect

d) a simple effect

e) an interaction

7. What makes his study experimental?

8. Fill in each blank with *a* or *e*.

a) Marijuana may \_\_\_ffect academics.

b) Marijuana may have an \_\_\_ffect on academics.

c) The \_\_\_ffects of marijuana increase with more usage.

d) Some people are particularly \_\_\_ffected by marijuana.

### **1-D Extraneous and Confounding Variables**

9. Assume James finds that the marijuana smokers perform worse academically.

a) What would be a causal relationship between academics and smoking marijuana?

b) Why will he not be able to conclude this?

c) What can he conclude?

10. Give a possible extraneous variable for this study, and explain how it could cause random error.

11. Give a possible confounding variable in this study, and explain how it could cause systematic error.

12. Sketch a diagram showing how the variables in questions 5 through 11 may affect each other.

13. For each of the following claims, identify a possible confounding variable, sketch a diagram showing it affecting both the independent and dependent variable, and write a sentence explaining how it could make the claim true correlationally but not causally.

b) Teens who binge drink are more susceptible to anxiety later in life.

a) People who live near industrial zones are more likely to have health problems.