Statistical Reasoning Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Quiz Review : Sections 6.1-6.2 Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Day: \_\_\_\_\_\_

**Short Answer:**

1. A company wants to test whether meditation techniques lower anxiety levels. The experimenter interviewed 60 subjects and assessed their levels of anxiety. The subjects than were randomly separated into 3 different groups, each learning a different meditation technique. The subjects performed mediation regularly for one month and then were re-assessed for their anxiety levels. The results were statistically significant.

1. Is this an observational or experimental study?
2. Should there have been a control group? If so, what lurking variables could have confounded
3. Draw a diagram to represent the study.
4. Describe the subjects, the explanatory variable, the response variable, and the treatment

for this study.

Subjects: Explanatory:

Response: Treatment:

1. What does “statistically significant” mean?

2. An experiment is to be conducted to determine if a new medicine for dogs and cats is more effective than the current drug on the market. There is a concern that dogs and cats will react differently to the drug.

(a) What type of design method would be best to use?

(b) Create a diagram that shows the sample design.

3. Which brand of laundry detergent gets stains out of white clothes better – Brand A or Brand B? All clothes

are washed on hot. An experiment is conducted with 100 white T-shirts, all of which contain grass stains.

1. What type of design method is used?
2. Can this study be blinded? Explain.
3. Would a control group be necessary? Explain.

4. In the above example, suppose we wanted to also measure what water temperature – hot, warm, cold - works best in addition to the detergents.

(a) Could this experiment be blinded?

(b) Create a diagram to describe all the treatments that can take place.

5. The journal Circulation reported that among 1900 people who had heart attacks, those who drank an

average of 19 cups of tea a week were 44% more likely than non-drinkers to survive at least 3 years after

the attack.

a) Is this an example of an observational study or an experiment?

b) Does it provide evidence that drinking tea leads to a longer lifespan after a heart attack (cause-effect)?

6. A farm-product manufacturer wants to determine if the yield of a crop is different when the soil is treated with three different types of fertilizers. Fifteen similar plots of land are planted with the same type of seed but are fertilized differently. At the end of the growing season, the mean yield from the sample plots is compared.

a) Identify the:

subjects: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

explanatory variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

response variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

treatment: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) What type of experiment is being carried out?

c) Draw a diagram to outline the design of the experiment.

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| \_\_\_\_ 1. anonymity  \_\_\_\_ 2. block design  \_\_\_\_ 3. clinical trial  \_\_\_\_ 4. confidentiality  \_\_\_\_ 5. confounding  \_\_\_\_ 6. control group  \_\_\_\_ 7. completely randomized experiment  \_\_\_\_ 8. double-blind experiment  \_\_\_\_ 9. experiment  \_\_\_\_ 10. explanatory variable  \_\_\_\_ 11. lurking variable  \_\_\_\_ 12. matched pairs design  \_\_\_\_ 13. nonadherers  \_\_\_\_ 14. placebo  \_\_\_\_ 15. placebo effect  \_\_\_\_ 16. randomized comparative experiment  \_\_\_\_ 17. response variable  \_\_\_\_ 18. statistically significant  \_\_\_\_ 19. subjects  \_\_\_\_ 20. treatment |  | A. experiment which studies the effectiveness of medical treatments on actual patients  B. an experiment in which neither the subjects nor the people who work with them know which treatment each subject is receiving  C. a study which deliberately imposes some treatment on individuals in order to observe their responses  D. a variable that has an important effect on the relationship among the variables in a study but is not one of the variables being studied  E. the influence of the explanatory variable cannot be distinguished from the influence of a lurking variable  F. a variable that we think explains or causes changes in the response variables  G. a dummy treatment with no active ingredients  H. the individuals studied in an experiment  I. an observed effect so large that it would rarely occur by chance  J. a variable that measures an outcome or result of a study  K. when the names of the subjects are not known to even the director of a study  L. favorable response to a dummy treatment  M. subjects are first grouped into similar traits and then randomization is carried out separately within each group  N. experimental technique comparing pairs of subjects that are alike as much as possible when each receives a different treatment  O. experiment in which all subjects are randomly assigned to treatments  P. policy of keeping all collected data about the individual subjects private  Q. subjects who do not follow the experimental treatment  R. any specific experimental condition applied to the subjects  S. a study comparing two or more treatments, using chance to decide which subjects get each treatment, and using enough subjects so that the effects of chance variations between the groups are small  T. the group in an experiment which receives the placebo treatment or a treatment which is already on the market |