

AP Statistics – UNIT 6 –Review Sheet Experimental Design

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

A designed experiment is described. Identify the specified element.

- 1) An education researcher was interested in examining the effect of the teaching method and the teacher on the reading level of students with learning disabilities. 257 students with learning disabilities participated in an experiment. There are four different teachers (Juliana, Felix, Sonia, and Helen) and three different teaching methods (A, B, and C). Students are randomly assigned to a teaching method and a teacher. Those who studied with Sonia using method B achieved the highest scores on a reading test. Identify the subjects studied. 1) _____
- A) Score on reading test
B) Students with learning disabilities
C) Teaching method
D) Students who studied with Sonia using method B
E) Teacher
- 2) 780 participants suffering from depression were randomly assigned to one of three groups. Over a four-month period, the first group received a low dosage of an experimental drug, the second group received a high dosage of the drug, and the third group received a placebo. At the end of the period each participant rated their mood on a scale of 1–5. Identify the treatments. 2) _____
- A) Mood level 1, mood level 2, mood level 3, mood level 4, mood level 5
B) Placebo, low dosage, high dosage
C) The dosage of the drug
D) The experimental drug, mood
E) The experimental drug

Determine whether the experiment is single-blind, double-blind, or neither.

- 3) Do Slimquick shakes reduce weight loss? Testers provide Slimquick shakes for participants in groups 1 and 5. Groups 2, 3, and 4 are provided with Stoutslow shakes. Results are evaluated by the group identifier, with no treatment information communicated. 3) _____
- A) Single-blind B) Double-blind C) Neither

Describe the design of the experiment (completely randomized or blocked).

- 4) A researcher wants to examine the effect of fertilizer and the effect of sunlight on the yield of tomatoes. She bought 60 tomato plants at a local garden store. She randomly assigned 30 tomato plants to be planted on the sunny side of the hill and 30 to be planted on the shady side. The 30 plants which are planted on the shady side are randomly assigned to one of three groups. The first group are grown with no fertilizer, the second group with a small amount of fertilizer, and the third group with a large amount of fertilizer. The 30 plants which are planted on the sunny side are likewise randomly assigned to one of three groups. The first group are grown with no fertilizer, the second group with a small amount of fertilizer, and the third group with a large amount of fertilizer. All tomato plants are planted at the same time and are all treated alike (in terms of how much they are watered, weeded etc). Each plant is grown to maturity. The total weight of tomatoes obtained from each plant is recorded.

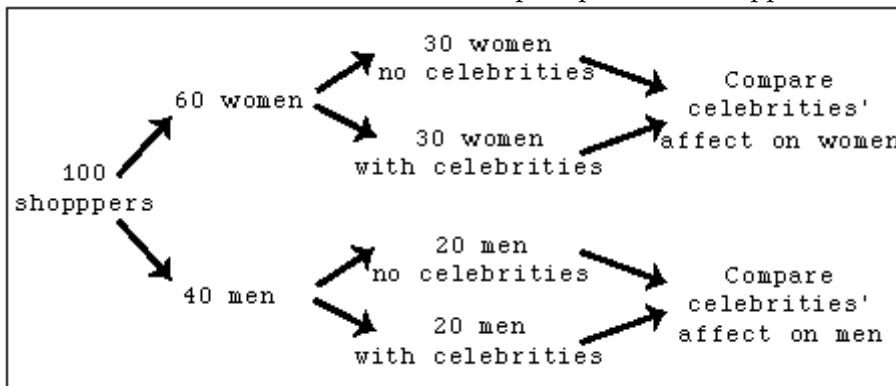
4) _____

- A) Completely randomized over one factor (location), blocked by fertilizer
- B) Blocked by fertilizer, blocked by location
- C) Completely randomized over two factors (fertilizer and location)
- D) Completely randomized over one factor (fertilizer)
- E) Completely randomized over one factor (fertilizer), blocked by location

Answer the question.

- 5) A clothing manufacturer is curious if celebrity endorsements will influence a customer's decision in buying its products. This clothing manufacturer premieres its latest series of commercials privately to two separate groups of potential shoppers. One group will see a series of commercials without celebrities, and one group will see a series of commercials with celebrities. Furthermore, the manufacturer decides to split up the male shoppers from the female shoppers.

5) _____



Grouping the shoppers together by gender is an example of what?

- A) Reduction of confounding factors
- B) Matching
- C) Factoring
- D) Blocking
- E) Stratifying

Identify the flaw(s) in the experiment or study described.

- 6) Researchers reported that for men, being unmarried increases the risk of depression. These findings were based on the medical records of 400 married men and 500 unmarried men. Since there is no random assignment, this conclusion is not justified because there may be lurking variables. Which of the following are possible lurking variables?

6) _____

I: Rate of depression
II: Income
III: Type of employment
IV: Age
V: Gender

- A) II, III, IV
B) III, IV
C) II, III, IV, V
D) I, II, III
E) II, IV

Provide an appropriate response.

- 7) Which of the following is not required in an experimental design?

7) _____

- A) blocking
B) replication
C) control
D) randomization
E) All are required in an experimental design.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 8) A consumer group wants to see if a new education program will improve the spending habits of college students. Students in an economics class are randomly assigned to three different courses on spending habits. How many factors are there?

8) _____

- 9) A researcher has developed a set of breathing exercises and would like to investigate whether they can help to reduce anxiety. She designs an experiment as follows. She will obtain a group of volunteers suffering from anxiety. They will be given a test to measure the level of their anxiety. Volunteers will be randomly assigned to one of three groups. Those in group 1 will do breathing exercises for 15 minutes per day, those in group 2 will do breathing exercises for 30 minutes per day, and those in group 3 (control group) will do no breathing exercises. After a suitable time period, each person will again take the anxiety test. The researcher will compare the average change in score for the three groups. Is it possible to double-blind this experiment? Explain.

9) _____

- 10) An agricultural researcher wishes to compare the yield of four different varieties of wheat. 64 plots of land are available for an experiment. On each plot of land one of the varieties of wheat will be grown. At the end of the experiment the yield for the different varieties will be compared. 32 of the plots are at one site (site A) and the other 32 are at another site (site B). The soil at site A differs significantly from the soil at site B. If the researcher wishes to design an experiment using randomized block design, how could the wheat varieties be assigned to the different plots?

10) _____

Answer Key

Testname: UNTITLED1

- 1) B
- 2) B
- 3) A
- 4) C
- 5) D
- 6) A
- 7) A
- 8) There is one factor (course on spending habits) with three levels.
- 9) No. Provided that the person administering the anxiety test and evaluating the level of anxiety is unaware of the patients' treatments, the experiment will be single-blind. However, the patients cannot be blinded to whether they are doing breathing exercises so it is not possible to double-blind the experiment.
- 10) Answers will vary. Possible answer: Randomly divide the 32 plots at site A into four groups of 8 plots each. Randomly assign each group of plots to a different variety of wheat. Randomly divide the 32 plots at site B into four groups of 8 plots each. Randomly assign each group of plots to a different variety of wheat.