

Prob/Stat
Review Unit 6

Name _____
Date _____

1. Match each of the following terms to the correct definition.

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|---------------------------------|---|
| _____ 1. Census | a. Observes individuals and measures variables of interest |
| _____ 2. Sample | b. Imposes treatment on individuals to observe responses |
| _____ 3. Descriptive Statistics | c. The complete collection of items under study |
| _____ 4. Population | d. A survey of all elements in a population |
| _____ 5. Statistical Inference | e. A subset of the population |
| _____ 6. Observational Study | f. Procedures for collecting, classifying, summarizing and presenting data |
| _____ 7. Experiment | g. Goes beyond the data itself to draw generalizations and make predictions |

2. A psychologist wants to study behavior patterns of the 8,563 college students at the state university. She decides to start by obtaining a random sample of 30 students and asking the average number of hours each member of the sample sleeps on a weekday night. For each of the following questions, identify the type of sample obtained (systematic, SRS, stratified, multistage, cluster)

- Students are separated into academic majors, and a sample of students are selected from each academic major _____
- Each student is assigned a number from 1 to 8563. A number from 1 to 285 is randomly selected, and every 285th student on the list from that point on is then included in the sample. _____
- Students are listed by number (1 to 8563) and a computer is used to generate a list of 30 numbers representing students to be used in the sample. _____
- Students are listed by their school residence location. Three residence locations are randomly selected. Then students from each of these locations are chosen for the psychologist's sample. _____

3. There are 63 students enrolled in a statistics course at RHS. Explain how you would generate a SRS of 10 of these students using a random digit table and using your graphing calculator.

4. Which of the following is a method for improving the accuracy of a sample?
- use no more than three or four words in any question
 - when possible, avoid the use of human interviewers, relying on computerized dialing instead
 - use larger sample sizes
 - use smaller sample sizes

5. Which of the following is **not** a potential source of bias in a survey?

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|------------------------------------|--------------------------------------|
| a. undercoverage | b. nonresponse |
| c. the use of convenience sampling | d. the use of simple random sampling |

6. Bias in a survey can occur when some groups in the populations are left out of the process of choosing the sample. What is this type of bias called?
- a. prejudice
 - b. undercoverage
 - c. response bias
 - d. stratification
7. Bias in a survey can occur when an individual for the sample can't be contacted or refuses to cooperate. What is this type of bias called?
- a. convenience sampling
 - b. response bias
 - c. nonresponse
 - d. undercoverage
8. We say that the design of a study is biased if which of the following is true?
- a. racial or sexual prejudice is suspected
 - b. random placebos have been used
 - c. it systematically favors certain outcomes
 - d. the correlation is greater than 1 or less than -1
9. What occurs in a double blind experiment?
- a. both eyes are blindfolded so as to deprive the subjects of visual input
 - b. subjects know neither what they are to do nor when they are to do it
 - c. neither subjects or evaluators know what treatment they are receiving
 - d. Units (usually animals) are not allowed to see other units nor investigators.
10. A block design corresponds to which of the following sampling designs?
- a. simple random sampling
 - b. stratified sampling
 - c. multistage sampling
 - d. convenience sampling
11. What is one reason for using random allocation to assign units to treatments in an experiment?
- a. to produce the placebo effect
 - b. to produce experimental groups that are similar
 - c. to eliminate lack of realism
 - d. to produce the blocks of block design
12. Which of the following is not a major principle of experimental design?
- a. control
 - b. replication
 - c. randomization
 - d. segmentation
13. The placebo effect refers to what?
- a. observing a positive correlation in data when the correlation should be negative
 - b. the fact that patients often respond favorably to any treatment, even the dummy treatment
 - c. the fact that patients typically feel more at ease in studies involving large groups than in those involving small groups
 - d. any biased diagnosis that occurs when the examining physician knows which treatment a patient received.
14. What do you call a specific experimental condition applied to the subjects or units in an experiment?
- a. an observation
 - b. the placebo effect
 - c. a treatment
 - d. the control

15. Control groups are used in experiments in order to what?
- Control the effects of lurking variables such as the placebo effect
 - Control the subjects of a study so as to insure all participate equally
 - Guarantee that someone other than the investigators, who have a vested interest in the outcome, control how the experiment is conducted.
 - Achieve a proper and uniform level of randomization.
16. A comparative design is used for which of the following purposes?
- to make sure that the randomization did, in fact, create equal groups by comparing them after the fact.
 - to ensure that influences other than the experimental treatments operate equally on all groups.
 - to guarantee that there is an outside standard with which to compare the results of the experiment.
 - To provide a basis by which the results of this and all similar experiments can be compared.
17. The results of an experiment are said to be statistically significant if what?
- they are important to statisticians, regardless of their importance to the investigators
 - both researchers and statisticians agree the results are meaningful and important
 - the observed effect is too large to attribute plausible to chance
 - they support the findings of previous, similar studies
18. What is a sample consisting of those people who choose themselves by responding to a general appeal called?
- census
 - write-in campaign
 - simple random sample
 - a voluntary response sample
19. A sample in which the population is first divided into groups of similar individuals and then a separate simple random sample is selected from each group and combined to form the full sample is called what?
- probability sample
 - stratified random sample
 - simple random sample
 - convenience sample
20. A sample in which every member of the population has a known, nonzero chance of being selected is called what?
- probability sample
 - stratified random sample
 - simple random sample
 - convenience sample
21. What is a sample of size n chosen in such a way that every set of n units in the population has an equal chance to be the sample actually selected called?
- simple random sample
 - block design
 - comparative study
 - cluster sample

22. A group of 60 college students viewed a 40 minute television program that included ads for a digital camera. Some subjects saw a 30 second commercial; others, a 90 second commercial. The same commercial was shown either 1, 3, or 5 times during the program. After viewing, all the subjects answered questions about their recall of the ad, their attitude toward the camera and their intention to purchase it.

Experimental Units _____

Response variable _____

Factors _____

Levels _____

Treatments _____

Design a completely randomized design for this experiment

23. Twenty overweight males have agreed to participate in a study of the effectiveness of four weight loss treatments: A, B, C, and D. The researcher first calculates how overweight each subject is by comparing the subject's actual weight with his ideal weight. The subjects and their excess weights in pounds are as follows:

Birnbaum	35	Hernandez	25	Moses	25	Smith	29
Brown	34	Jackson	33	Nevesky	39	Stall	33
Brunk	30	Kendall	28	Obrach	30	Tran	35
Cruz	34	Loren	32	Rodriguez	30	Wilansky	42
Deng	24	Mann	28	Santiago	27	Williams	22

The response variable is the weight loss after 8 weeks of treatment. Previous studies have shown that the effects of a diet may vary based on a subject's initial weight.

- a. Explain why a block design would be better than a completely randomized design in this setting.
- b. Should researchers form blocks of size 4 based on subjects' last names in alphabetical order or by how overweight the subjects are? Explain
- c. In b above, why do you want to create blocks of size 4?