60080079 Introduction to Statistical Methods
Semester 2 2023-2024
Homework Assignment 3

21 CST H3Art

1. A market research company wishes to find out whether the population of students at a university prefers brand A or brand B of instant coffee. A random sample of students is selected, and each one is asked to try one brand and then the other brand (with the order determined at random). They then indicate which brand they prefer. The response variable is:

   1) whether brand A or B is tried first.
   2) which brand they prefer.
   3) the two brands of coffee.

   Write your answer as a single-digit number.

   Answer: 2

2. A study was conducted at Seattle Grace Hospital comparing the death rates of two new surgical residents. Dr. A had approximately 7% of his patients die, while Dr. B had only 5% die. Is it safe for the Chief of Surgery to assume that Dr. B is a better surgeon?

   1) Yes, it is because he has lost fewer patients than Dr. A.
   2) Little if anything can be concluded because not all doctors were sampled.
   3) This is an observational study, so nothing can really be concluded.

   Write your answer as a single-digit number.

   Answer: 3

3. Pepsi is conducting a taste test to see whether or not consumers enjoy their product more than Coke. The best type of experiment used for this study is a:

   1) matched pairs experiment.
   2) double blind experiment.
   3) randomized block designed experiment.

   Write your answer as a single-digit number.

   Answer: 1

4. A popcorn company would like to determine the optimum microwave settings for popping a bag of its popcorn. They will test two different cooking times (4 minutes or 5 minutes) and two different temperature settings (low or high). Three bags of popcorn will be popped at each combination of factor levels in the same microwave, with the order randomly determined. The percentage of unpopped kernels will then be compared for each treatment.

4.1 What is/are the factor(s) in this experiment?
1) Time and temperature
2) 4 minutes, 5 minutes, low, high
3) 4 minutes/low, 4 minutes/high, 5 minutes/low, 5 minutes/high

4.2 How many treatment conditions are used in this experiment?
1) 4
2) 5
3) 6
4) 7
5) 8

4.3 How many responses will we have?
1) 6
2) 12
3) 18
4) 24
5) 30

Write your answer as a three-digit number.

Answer: 112

5. The administration at a large state university is interested in getting the opinions of students on a proposed instructional fee for use of computer labs on campus. They select a simple random sample of 50 freshman, a simple random sample of 50 sophomores, 50 juniors, and 50 seniors. This is an example of a:

   1) systematic sample.
   2) stratified random sample.
   3) simple random sample.

   Write your answer as a single-digit number.

   Answer: 2

6. A pollster uses a computer to generate 500 random numbers, then interviews the voters corresponding to those numbers. Which type of sampling is being used?

   1) Stratified
   2) Cluster
   3) Matched pair
   4) Simple random
   5) Convenience

Write your answer as a single-digit number.

Answer: 4

7. Which of the following is a reason to use randomization?

   1) To balance the groups on variables that you know affect the response
   2) To eliminate bias that may result if you assign the subjects
   3) To balance the groups on lurking variables that may be unknown to you
   4) All of the above
   5) None of the above

   Write your answer as a single-digit number.

   Answer: 4

8. In a controversial election district, **73%** of registered voters are Democrat. A random survey of 500 voters had **68%** Democrats. Are the numbers **73%** and **68%:** parameters or statistics?

   1) Both are statistics.
   2) 73% is a parameter, and 68% is a statistic.
   3) 73% is a statistic, and 68% is a parameter.

   Write your answer as a single-digit number.

   Answer: 2

9. A treatment that has no risk of physical harm to subjects is always ethical.

   1) True
   2) False

   Write your answer as a single-digit number.

   Answer: 2

10. The file **HW3_sampling.xlsx** contains a pool of 20 individuals and three associated variables, namely, ID, Sex and Random Number. We wish to select 10 individuals from the pool as participants, and use the random numbers in ascending order.

    11.1 If we use simple random sampling, there will be __ male participants.
    1) 4
    2) 5
    3) 6
    4) 7

11.2 If we use stratified random sampling to ensure that there are equal number of male and female participants, individuals 2 and 3 (1) will / (2) will not be selected, whereas individuals 12 and 13 (1) will / (2) will not be selected.

Write your answer as a three-digit number.

Answer: 312