Classroom Voting Questions: Statistics

Inference for a Single Proportion

1. To estimate the proportion of students at a university who watch reality TV shows, a random sample of 50 students was selected and resulted in a sample proportion of .3. A 95% confidence interval for the proportion that watches reality TV would be _____ a 90% confidence interval.

   (a) narrower than

   (b) the same width as

   (c) wider than

2. Suppose we wish to estimate the percentage of students who smoke marijuana at each of several liberal arts colleges. Two such colleges are StonyCreek (enrollment 5,000) and Whimsy (enrollment 13,000). The Dean of each college decides to take a random sample of 10% of the entire student population. The margin of error for a simple random sample of 10% of the population of students at each school will be

   (a) smaller for Whimsy than for StonyCreek.

   (b) smaller for StonyCreek than for Whimsy.

   (c) the same for each school.

   (d) insufficient information

3. Suppose we wish to estimate the percentage of people who speed while driving in a college town. We choose to sample the populations of Austin, TX (University of Texas) and Norman, OK (University of Oklahoma). We know that both cities have populations over 100,000 and that Austin is approximately 5 times bigger (in population) than Norman. We also expect the rates of speeding to be about the same in each city. Suppose we were to take a random sample of 1000 drivers from each city. The margin of error for a simple random sample of the population of drivers from each city will be

   (a) smaller for the Austin sample than the Norman sample.

   (b) smaller for the Norman sample than the Austin sample.

   (c) the same for both samples.

   (d) not possible to determine without more precise information about the population sizes.

4. A parachute manufacturer is concerned that the failure rate of 0.1% advertised by his company may in fact be higher. What is the null hypothesis for the test he would run to address his worries.

   (a) $H_0 : \mu = 0.001$

   (b) $H_0 : p > 0.001$

   (c) $H_0 : \mu < 0.001$

   (d) $H_0 : p = 0.001$

5. A parachute manufacturer is concerned that the failure rate of 0.1% advertised by his company may in fact be higher. A hypothesis test was run and the result was a P-value of 0.03333. The most likely conclusion the manufacturer might make is:

   (a) My parachutes are safer than I claim.

   (b) My parachutes are not as safe as I claim them to be.

   (c) I can make no assumption of safety based on a statistical test.

   (d) The probability of a parachute failure is 0.03333.

   (e) Both (b) and (d) are true.

6. To explain the meaning of a P-value of 0.033, you could say:

   (a) There is approximately a 96.7% chance of obtaining my sample results.

   (b) Assuming the null hypothesis is accurate, results like those found in my sample should occur only 3.3% of the time.

   (c) We can't say anything for sure without knowing the sample results.

   (d) There is approximately a 3.3% chance of obtaining my sample results.

7. Suppose we have the results of a Gallup survey (simple random sampling) which asks participants for their opinions regarding their attitudes toward technology. Based on 1500 interviews, the Gallup report makes confidence statements about its conclusions. If 64% of those interviewed favored modern technology, we can be 95% confident that the percent of those who favored modern technology is

   (a) 95% of 64%, or 60.8%

   (b) 95% $\pm$ 3%

   (c) 64%

   (d) 64% $\pm$ 3%

8. A confidence interval for a proportion is constructed using a sample proportion of 0.5. If the sample proportion was 0.9 instead of 0.5, what would happen to the width of the resulting confidence interval?

   (a) The new CI would be narrower.

   (b) The new CI would have the same width.

   (c) The new CI would be wider.

9. A sample needs to taken to answer the question Have you ever shoplifted? Assuming a random sample can be found, how many people would need to be polled to insure a margin of error of no more than 3% with 90% confidence?

   (a) 1068

   (b) 752

   (c) 23

   (d) None of the above

10. A sample needs to be taken to answer the question, "Have you jaywalked in the past month?" Assume that based on past studies we can be almost certain that the actual percentage of the population that jaywalks in any given month is between 70% and 90%. Assuming a random sample can be obtained, how many people would need to be polled to insure a margin of error of no more than 3% with 95% confidence?

   (a) 1068

   (b) 897

   (c) 385

   (d) None of the above

11. A sample needs to be taken to answer the question, "Have you voted in a local election in the past 10 years?" Assume that based on past studies we can be almost certain that the actual population percentage is between 45% and 75%. Assuming a random sample can be obtained, how many people would need to be polled to insure a margin of error of no more than 3% with 99% confidence?

   (a) 1844

   (b) 1825

   (c) 1383

   (d) None of the above

12. The margin of error is computed for a poll with a sample size of 50. Approximately what sample size would you need if you wanted to cut the margin of error in half?

    (a) 25
    (b) 100
    (c) 200
    (d) 400

13. Which of the following does *not* result in a larger margin of error?

    (a) Increasing the confidence level
    (b) Decreasing the sample size
    (c) Having a larger population size

14. Terrance hypothesizes that less than 20% of the population has a favorable view of the latest flavor-of-the-month boy band. He conducts a hypothesis test and gets $P = 0.0001$. Which of the following might be a reasonable summary of the results?

    (a) Accept the null hypothesis. The data provide sufficient evidence to conclude that less than 20% of the population has a favorable view of the band ($P = 0.0001$).
    (b) Accept the null hypothesis. The data do not provide sufficient evidence to conclude that less than 20% of the population has a favorable view of the band ($P = 0.0001$).
    (c) Reject the null hypothesis. The data provide sufficient evidence to conclude that less than 20% of the population has a favorable view of the band ($P = 0.0001$).
    (d) Reject the null hypothesis. The data do not provide sufficient evidence to conclude that less than 20% of the population has a favorable view of the band ($P = 0.0001$).