

**Multiple Choice.**

1. To determine the average spent on entertainment during a year in college, a simple random sample of 35 students is interviewed, showing a mean of \$825 with a standard deviation of \$240. Which of the following is the best interpretation of a 90 percent confidence interval estimate for the average spent on entertainment during a year in college?
- (a) 90 percent of college students spend between \$756 and \$894 on entertainment yearly.
  - (b) 90 percent of college students spend a mean dollar amount on entertainment yearly that is between \$756 and \$894.
  - (c) We are 90 percent confident that college students spend between \$756 and \$894 on entertainment yearly.
  - (d) We are 90 percent confident that college students spend a mean dollar amount between \$756 and \$894 on entertainment yearly.
  - (e) We are 90 percent confident that in the chosen sample, the mean dollar amount spent on entertainment yearly by college students is between \$756 and \$894.
2. What is the critical  $t$ -value for finding a 96 percent confidence interval estimate from a sample of 18 observations?
- (a) 2.054            (b) 2.205            (c) 2.224            (d) 2.214            (e) 2.235
3. Which of the following would result in the widest confidence interval?
- (a) Small sample size and 95 percent confidence
  - (b) Small sample size and 99 percent confidence
  - (c) Large sample size and 95 percent confidence
  - (d) Large sample size and 99 percent confidence
  - (e) This cannot be answered without knowing an appropriate standard deviation
4. When an online news magazine asked viewers to click their agreement or disagreement, 300 out of 1,200 respondents agreed with a statement that the most practical way of becoming a millionaire is winning a lottery. Immediate feedback stated that 25 percent of the viewers, with a margin of error of  $\pm 2.5$  percent, agreed with the statement. Find print claimed 95% confidence. What is the proper conclusion?
- (a) We are 95 percent confident that the proportion of viewers who believe that the most practical way of becoming a millionaire is winning the lottery is between .225 and .275.
  - (b) Without knowing whether both  $np$  and  $n(1 - p)$  are  $> 10$ , the calculation is inappropriate
  - (c) Without knowing whether or not the 1,200 respondents are 10 percent of all viewers, the calculator is inappropriate.
  - (d) The  $z$ -distribution was inappropriately used instead of the  $t$ -distribution.
  - (e) The data was not an SRS, so the calculation is inappropriate.
5. The school superintendent wants to know what percentage of property owners are willing to support an increase in school taxes. What size sample should be obtained to determine with 90 percent confidence the support level to within 5 percent?
- (a) 17            (b) 33            (c) 271            (d) 289            (e) 1,083

6. Suppose (48, 65) is a 95 percent confidence interval estimate for a population mean  $\mu$ . Which of the following are true statements?

I. There is a .95 probability that  $\mu$  is between 48 and 65.

II. If 100 random samples of the given size are picked and a 95 percent confidence interval estimate is calculated from each, then  $\mu$  will be in 95 of the resulting intervals.

III. If 95 percent confidence intervals are calculated from all possible samples of the given size,  $\mu$  will be in 95 percent of these intervals.

(a) I and II

(b) I and III

(c) II and III

(d) I, II, and III

(e) None of the above gives the complete set of true responses.

7. Four math majors received the following salary offers upon graduation: \$48,000, \$55,000, \$42,000, and \$51,000. Assuming all assumptions are met, establish a 95 percent confidence interval for the population mean.

(a)  $49,000 \pm 3.182 \left( \frac{5,477}{\sqrt{4}} \right)$

(b)  $49,000 \pm 2.776 \left( \frac{5,477}{\sqrt{3}} \right)$

(c)  $49,000 \pm 3.182 \left( \frac{5,477}{\sqrt{3}} \right)$

(d)  $49,000 \pm 2.776 \left( \frac{5,477}{\sqrt{4}} \right)$

(e)  $49,000 \pm 1.96 \left( \frac{5,477}{\sqrt{3}} \right)$

8. Two 95 percent confidence interval estimates are obtained: I (78.5, 84.5) and II (80.3, 88.2).

a. If the sample sizes are the same, which has the larger standard deviation?

b. If the sample standard deviations are the same, which has the larger size?

(a) a. I, b. I

(b) a. I, b. II

(c) a. II, b. I

(d) a. II, b. II

(e) More information is needed to answer these questions.

9. A survey is to be taken to estimate the proportion of voters who favor stem cell research. Among the following proposed sample sizes, which is the smallest that will still guarantee a margin of error of at most .035 for a 96 percent confidence interval?

(a) 30

(b) 784

(c) 841

(d) 900

(e) 961

10. When making an inference about a population mean, which of the following suggests the using a critical value of  $z^*$  rather than  $t^*$ ?

(a) The population standard deviation is known.

(b) Outliers are absent.

(c) The population is normal.

(d) Strong skew is absent.

(e) The sample size is under 30.

**Answers: 1. D, 2. C, 3. B, 4. E, 5. C, 6. E, 7. A, 8. C, 9. D, 10. A**