

CHAPTER 7 FORM B

Name _____ Course Number: _____ Section Number: _____

Directions: Answer Question #20 in the space provided. Circle the correct choice for each response set. If required, show calculations in the blank spaces near the problems, or attach paper.

Express the confidence interval using the indicated format.

1) Express the confidence interval $0.35 < p < 0.63$ in the form of $\hat{p} \pm E$.

- A) 0.49 ± 0.14 B) 0.35 ± 0.28 C) 0.49 ± 0.28 D) 0.35 ± 0.14

Solve the problem.

2) The following confidence interval is obtained for a population proportion, p : (0.528, 0.554). Use these confidence interval limits to find the margin of error, E .

- A) 0.013 B) 0.026 C) 0.011 D) 0.014

Assume that a sample is used to estimate a population proportion p . Find the margin of error E that corresponds to the given statistics and confidence level. Round the margin of error to four decimal places.

3) 99% confidence; $n = 2900$, $x = 580$

- A) 0.0110 B) 0.0146 C) 0.0191 D) 0.0168

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p .

4) $n = 72$, $x = 27$; 95% confidence

- A) $0.281 < p < 0.469$ B) $0.280 < p < 0.470$
C) $0.263 < p < 0.487$ D) $0.262 < p < 0.488$

Use the given data to find the minimum sample size required to estimate the population proportion.

5) Margin of error: 0.011; confidence level: 92%; \hat{p} and \hat{q} unknown

- A) 6328 B) 8327 C) 5325 D) 6177

6) Margin of error: 0.04; confidence level: 95%; from a prior study, \hat{p} is estimated by the decimal equivalent of 94%.

- A) 408 B) 120 C) 5 D) 136

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p .

7) Of 238 employees selected randomly from one company, 10.08% of them commute by carpooling. Construct a 90% confidence interval for the true percentage of all employees of the company who carpool.

- A) $6.87\% < p < 13.3\%$ B) $5.05\% < p < 15.1\%$
C) $6.26\% < p < 13.9\%$ D) $5.54\% < p < 14.6\%$

Find the indicated critical z value.

8) Find the critical value $z_{\alpha/2}$ that corresponds to a 91% confidence level.

- A) 1.34 B) 1.70 C) 1.645 D) 1.75

Determine whether the given conditions justify using the margin of error $E = z_{\alpha/2} \sigma / \sqrt{n}$ when finding a confidence interval estimate of the population mean μ .

9) The sample size is $n = 7$ and σ is not known.

- A) No B) Yes

Use the confidence level and sample data to find the margin of error E. Round your answer to the same number of decimal places as the sample mean unless otherwise noted.

10) College students' annual earnings: 99% confidence; $n = 72$, $\bar{x} = \$3898$, $\sigma = \$848$

- A) \$196 B) \$233 C) \$1183 D) \$257

Use the confidence level and sample data to find a confidence interval for estimating the population μ . Round your answer to the same number of decimal places as the sample mean.

11) Test scores: $n = 76$, $\bar{x} = 53.0$, $\sigma = 5.9$; 98% confidence

- A) $51.4 < \mu < 54.6$ B) $51.9 < \mu < 54.1$
 C) $51.7 < \mu < 54.3$ D) $51.3 < \mu < 54.7$

Use the given information to find the minimum sample size required to estimate an unknown population mean μ .

12) How many weeks of data must be randomly sampled to estimate the mean weekly sales of a new line of athletic footwear? We want 99% confidence that the sample mean is within \$500 of the population mean, and the population standard deviation is known to be \$1500.

- A) 49 B) 60 C) 25 D) 35

Do one of the following, as appropriate: (a) Find the critical value $z_{\alpha/2}$, (b) find the critical value $t_{\alpha/2}$, (c) state that neither the normal nor the t distribution applies.

13) 95%; $n = 11$; σ is known; population appears to be very skewed.

- A) $t_{\alpha/2} = 2.228$
 B) $z_{\alpha/2} = 1.96$
 C) $z_{\alpha/2} = 1.812$
 D) Neither the normal nor the t distribution applies.

Assume that a sample is used to estimate a population mean μ . Use the given confidence level and sample data to find the margin of error. Assume that the sample is a simple random sample and the population has a normal distribution. Round your answer to one more decimal place than the sample standard deviation.

- 14) 95% confidence; $n = 51$; $\bar{x} = 477$; $s = 84$
- A) 21.2 B) 49.6 C) 23.6 D) 30.7

Use the given degree of confidence and sample data to construct a confidence interval for the population mean μ . Assume that the population has a normal distribution.

- 15) A sociologist develops a test to measure attitudes towards public transportation, and 27 randomly selected subjects are given the test. Their mean score is 76.2 and their standard deviation is 21.4. Construct the 95% confidence interval for the mean score of all such subjects.
- A) $67.7 < \mu < 84.7$ B) $74.6 < \mu < 77.8$
 C) $69.2 < \mu < 83.2$ D) $64.2 < \mu < 88.2$

Solve the problem.

- 16) Find the critical value $\chi^2_{\frac{\alpha}{2}}$ corresponding to a sample size of 13 and a confidence level of 95 percent.
- A) 23.337 B) 4.404 C) 5.226 D) 21.026

Use the given degree of confidence and sample data to find a confidence interval for the population standard deviation σ . Assume that the population has a normal distribution. Round the confidence interval limits to the same number of decimal places as the sample standard deviation.

- 17) The mean replacement time for a random sample of 20 washing machines is 11.6 years and the standard deviation is 2.3 years. Construct a 99% confidence interval for the standard deviation, σ , of the replacement times of all washing machines of this type.
- A) $1.6 \text{ yr} < \sigma < 4.8 \text{ yr}$ B) $1.6 \text{ yr} < \sigma < 4.4 \text{ yr}$
 C) $1.6 \text{ yr} < \sigma < 3.8 \text{ yr}$ D) $1.7 \text{ yr} < \sigma < 3.6 \text{ yr}$

Find the appropriate minimum sample size.

- 18) You want to be 99% confident that the sample standard deviation s is within 5% of the population standard deviation.
- A) 2434 B) 1336 C) 2638 D) 923

Use the given degree of confidence and sample data to find a confidence interval for the population standard deviation σ . Assume that the population has a normal distribution. Round the confidence interval limits to one more decimal place than is used for the original set of data.

- 19) The football coach randomly selected ten players and timed how long each player took to perform a certain drill. The times (in minutes) were:

13 14 11 13 14
6 10 13 13 8

Find a 95% confidence interval for the population standard deviation σ .

- A) $1.9 \text{ min} < \sigma < 4.5 \text{ min}$ B) $1.8 \text{ min} < \sigma < 4.5 \text{ min}$
C) $1.9 \text{ min} < \sigma < 5.0 \text{ min}$ D) $0.7 \text{ min} < \sigma < 2.2 \text{ min}$

Provide an appropriate response.

- 20) The Bide-a-While efficiency hotel, which caters to business workers who stay for extended periods of time (weeks or months), offers room service. In a small study of 35 randomly selected room service orders, the 95% confidence interval for mean delivery time for room service is $24.8 < \mu < 29.6$ minutes. The marketing director is trying to determine if she can advertise "room service in under 30 minutes, or the order is free." How would you advise her?

Answer Key

Testname: CHAPTER 7 FORM B

- 1) A
- 2) A
- 3) C
- 4) C
- 5) A
- 6) D
- 7) A
- 8) B
- 9) A
- 10) D
- 11) A
- 12) B
- 13) D
- 14) C
- 15) A
- 16) A
- 17) C
- 18) B
- 19) C
- 20) We are 95% sure that the interval $24.8 < \mu < 29.6$ minutes contains the true mean. But it is incorrect to say μ has a 95% chance of falling within the specific limits of 24.8 and 29.6 minutes. Therefore, it would not be advisable to advertise room service in under 30 minutes.