STA2023 Module 9 Test

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the requested confidence interval.

1) A survey revealed the amount of pocket money held by each student in a sample of students from Statistics 205. The amounts (in dollars) are 5.50, 10.20, 3.15, 6.08, 4.85, 4.80, 4.70, 8.52, 7.90, 6.10, 3.50, 5.40, 7.10, 9.60, 6.20, and 4.28. Assuming $\sigma = 2.00$, find the 99.74% confidence interval for the population mean.

A) \$0 to \$4.00 B) \$4.62 to \$7.62 C) \$5.62 to \$6.62 D) \$4.12 to \$8.12

Answer: B

Objective: (8.1) Find Confidence Interval for Mean

Provide an appropriate response.

2) In stating a confidence-interval estimate of a population mean, the level of confidence increases as the size of the interval _____.

A) decreases B) increases

Answer: B

Objective: (8.1) Know Concepts: Estimating a Population Mean

Find the requested value.

3) A long-distance phone company wishes to estimate the mean duration of long-distance calls originating in California. A random sample of 15 long-distance calls originating in California yields the following call durations, in minutes.

2	1	2	4	2
36	17	29	16	38
1	19	12	2	37

Use the data to obtain a point estimate of the mean call duration for all long-distance calls originating in California.

A) 15.4 minutes B) 14.5 minutes C) 15.0 minutes D) 14.7 minutes

Answer: B

Objective: (8.1) Find Point Estimate of Mean

Provide an appropriate response.

4) Is it true that the point estimate of a population mean must lie within the range of values defined by the corresponding confidence-interval estimate, regardless of the level of confidence achieved? Explain.

A) No. The confidence interval only defines a range of values that is likely to contain the point estimate with some prescribed level of confidence. This range of values is not guaranteed to contain the point estimate.

B) Yes. By definition, the prescribed confidence interval contains the value of the point estimate.

Answer: B

Objective: (8.1) Know Concepts: Estimating a Population Mean

5) Find the value of α that corresponds to a confidence level of 96.6%.

A) 0.34 B) 0.034 C) 3.4 D) 0.966

Answer: B

Objective: (8.2) Find Alpha or Confidence Level from One Given

6) Find the value of α that corresponds to a confidence level of 84%.

A) 0.16 B) 0.84 C) 0.016 D) 16

Answer: A

Objective: (8.2) Find Alpha or Confidence Level from One Given

Find the confidence interval specified.

7) The mean score, $\bar{x}$, on an aptitude test for a random sample of 9 students was 64. Assuming that $\sigma = 16$, construct a 95.44% confidence interval for the mean score, μ, of all students taking the test.

A) 32 to 96 B) 56.0 to 72.0 C) 53.3 to 74.7 D) 60.4 to 67.6

Answer: C

Objective: (8.2) Find Confidence Interval for Mean (Sigma Known)

8) 30 people are selected randomly from a certain town. If their mean age is 48.3 and $\sigma = 5.7$, find a 95% confidence interval for the true mean age, μ, of everyone in the town.

A) 46.26 to 50.34 B) 46.27 to 50.33 C) 45.55 to 51.05 D) 46.97 to 49.63

Answer: A

Objective: (8.2) Find Confidence Interval for Mean (Sigma Known)

Provide an appropriate response.

9) Suppose that scores for men on an aptitude test have greater variability than scores for women on the same test. In other words, the population standard deviation is greater for the population of men than for the population of women. Based on a sample of size 50, a 95% confidence interval for the mean score, μ, of all women has a margin of error of 2.2. Which of the following confidence intervals will have a smaller margin of error?

A. A 99% confidence interval for the mean score of women. Sample size = 50
B. A 95% confidence interval for the mean score of women. Sample size = 100
C. A 95% confidence interval for the mean score of men. Sample size = 50

A) C B) B C) A D) A, B, C

Answer: B

Objective: (8.3) *Know Concepts: Margin of Error

10) Suppose you have obtained a confidence interval for μ, but wish to obtain a greater degree of precision. Which of the following would result in a narrower confidence interval?

A. Increasing the sample size while keeping the confidence level fixed
B. Decreasing the sample size while keeping the confidence level fixed
C. Increasing the confidence level while keeping the sample size fixed
D. Decreasing the confidence level while keeping the sample size fixed

A) A and C B) A and D C) B and D D) B and C

Answer: B

Objective: (8.3) *Know Concepts: Margin of Error

Find the necessary sample size.

11) The monthly earnings of a group of business students are are normally distributed with a standard deviation of 549 dollars. A researcher wants to estimate the mean monthly earnings of all business students. Find the sample size needed to have a confidence level of 95% and a margin of error of 137 dollars.

A) 54 B) 2 C) 5 D) 62

Answer: D

Objective: (8.3) Find Sample Size Given Margin of Error

Solve the problem.

12) A sample of 33 washing machines yields a mean replacement time of 10.0 years. Assuming that $\sigma = 2.0$ years, find the margin of error in estimating μ at the 90% level of confidence.

A) 0.4 years B) 0.1 years C) 0.6 years D) 2.9 years

Answer: C

Objective: (8.3) Find Margin of Error

Determine the margin of error in estimating the population mean, μ.

13) Based on a sample of size 44, a 95% confidence interval for the mean score of all students, μ, on an aptitude test is from 60 to 66. Find the margin of error.

A) There is not enough information to find the margin of error.
B) 6
C) 0.89
D) 3.0

Answer: D

Objective: (8.3) Find Margin of Error or Confidence Interval Given One

Provide an appropriate response.

14) When estimating a population mean by a sample mean, which of the following does the margin of error <u>not</u> depend on?

A) The sample size B) The population standard deviation
C) The confidence level D) The sample mean

Answer: D

Objective: (8.3) *Know Concepts: Margin of Error

Find the specified t–value.

15) For a t–curve with df = 11, find $t_{0.10}$.

A) 1.363 B) 1.372 C) 2.718 D) 1.280

Answer: A

Objective: (8.4) Find t-Value

16) For a t–curve with df = 24, find $t_{0.005}$.

A) 2.807 B) 2.797 C) 2.492 D) 1.711

Answer: B

Objective: (8.4) Find t-Value

Provide an appropriate response.

17) Suppose that you wish to obtain a confidence interval for a population mean. Under the conditions described below, should you use the z–interval procedure, the t–interval procedure, or neither?

– The population standard deviation is unknown.
– The data contain outliers.
– The sample size is small.

A) z–interval procedure B) Neither C) t–interval procedure

Answer: B
Objective: (8.4) *Know Concepts: Confidence Intervals (Sigma Unknown)

Find the specified t–value.

18) For a t–curve with df = 23, find the t–value having area 0.10 to its left.

A) –1.319 B) 2.500 C) 1.319 D) –2.500

Answer: A
Objective: (8.4) Find t-Value

Find the confidence interval specified. Assume that the population is normally distributed.

19) A savings and loan association needs information concerning the checking account balances of its local customers. A random sample of 14 accounts was checked and yielded a mean balance of $664.14 and a standard deviation of $297.29. Find a 90% confidence interval for the true mean checking account balance for local customers.

A) $492.52 to $835.76 B) $493.71 to $834.57
C) $523.43 to $804.85 D) $455.65 to $872.63

Answer: C
Objective: (8.4) Find Confidence Interval for Mean (Sigma Unknown)

Provide an appropriate response.

20) Suppose that you wish to obtain a confidence interval for a population mean. Under the conditions described below, should you use the z–interval procedure, the t–interval procedure, or neither?

– The population standard deviation is known.
– The population is not normally distributed.
– The sample size is 12.

A) Neither B) t–interval procedure C) z–interval procedure

Answer: A
Objective: (8.4) *Know Concepts: Confidence Intervals (Sigma Unknown)