

## Examrace

### Statistics MCQs – Estimation Part 1

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1. Which of the following statements is not correct?

- a. When an interval estimate is associated with a degree of confidence that it actually includes the population parameter of interest, it is referred to as a confidence interval
- b. If the population mean and population standard deviation are both known, one can make probability statements about individual  $x$  values taken from the population
- c. If the population mean and population standard deviation are both known, one can use the central limit theorem and make probability statements about the means of samples taken from the population
- d. If the population mean is unknown, one can use sample data as the basis from which to make probability statements about the true (but unknown) value of the population mean
- e. when sample data are used for estimating a population mean, sampling error will not be present since the observed sample statistic will not differ from the actual value of the population parameter

Answer: E

2. Inferential statistics is the:

- a. process of using a population parameter to estimate the values for sample statistics
- b. process of using sample statistics to estimate population parameters
- c. process which allows the researcher to determine the exact values for population parameters
- d. process that eliminates the problem of sampling error
- e. branch of statistics involving using population parameters to estimate sampling distributions

Answer: B

3. Which of the following statements are correct?

- a. a point estimate is an estimate of the range of a population parameter

- b. a point estimate is an unbiased estimator if its standard deviation is the same as the actual value of the population standard deviation
- c. a point estimate is a single value estimate of the value of a population parameter
- d. all of the above statements are correct
- e. none of the above statements are correct

Answer: C

4. A point estimator is defined as:
- a. the average of the sample values
  - b. the average of the population values
  - c. a single value that is the best estimate of an unknown population parameter
  - d. a single value that is the best estimate of an unknown sample statistic
  - e. a number which can be used to estimate a point in time which is unknown

Answer: C

5. Which of the following statements is/are correct?
- a. an interval estimate is an estimate of the range of possible values for a population parameter
  - b. an interval estimate describes a range of values that is likely not to include the actual population parameter
  - c. an interval estimate is an estimate of the range for a sample statistic
  - d. all of the statements above are correct
  - e. none of the statements above are correct

Answer: A

6. A confidence interval is defined as:
- a. a point estimate plus or minus a specific level of confidence
  - b. a lower and upper confidence limit associated with a specific level of confidence
  - c. an interval that has a 95 % probability of containing the population parameter
  - d. a lower and upper confidence limit that has a 95 % probability of containing the population parameter
  - e. an interval used to infer something about an unknown sample statistic value

Answer: B

7. The term  $1 - \alpha$  refers to the:

- a. probability that a confidence interval does not contain the population parameter
- b. the level of confidence minus one
- c. the level of confidence
- d. the level of confidence plus one
- e. the level of significance

Answer: C

8. A 95 % confidence interval for the population mean is calculated to be 75.29 to 81.45. If the confidence level is reduced to 90 % , the confidence interval will:

- a. become narrower
- b. remain the same
- c. become wider
- d. double in size
- e. most likely no longer include the true value of the population mean

Answer: A

9. A 95 % confidence interval for the population mean is calculated to be 75.29 to 81.45. If the confidence level is increased to 98 % , the confidence interval will:

- a. become narrower
- b. remain the same
- c. become wider
- d. double in size
- e. most likely no longer include the true value of the population mean

Answer: C

10. In the formula for the confidence interval,  $z_{\alpha/2}$  is part of the formula. What does the subscript  $\alpha/2$  refer to?

- a. the level of confidence
- b. the level of significance
- c. the probability that the confidence interval will contain the population mean
- d. the probability that the confidence interval will not contain the population mean
- e. the area in the lower tail or upper tail of the sampling distribution of the sample mean

Answer: E

11. Which of the statements below completes the following statement correctly? The larger the level of confidence used in constructing a confidence interval estimate of the population mean, the:

- a. smaller the probability that the confidence interval will contain the population mean
- b. the smaller the value of  $z_{\alpha/2}$
- c. the narrower the confidence interval
- d. the wider the confidence interval
- e. the more the width of the confidence interval remains the same

Answer: D

12. Which one of the statements below is correct?

- a. If  $n$ , the sample size, increases, the confidence interval becomes wider
- b. A 90 % confidence interval for the population mean is narrower than a 95 % confidence interval for the population mean
- c. As the population standard deviation increases, the confidence interval becomes narrower
- d. If  $\alpha = 0.01$ , it implies that we are 1 % confident that the population mean will lie between the confidence limits
- e. none of the above statements is correct

Answer: B

13. The boundaries of a confidence interval are called:

- a. Confidence levels
- b. The test statistics
- c. The degrees of confidence
- d. The confidence limits
- e. Significance levels

Answer: D

14. What value of  $z$  would you use to calculate the 80 % confidence interval for a population mean, given that you know the population standard deviation, the sample size and the sample mean of your sample?

- a.  $z = 1.96$

- b.  $z = 2.58$
- c.  $z = 0.84$
- d.  $z = 1.28$
- e.  $z = 1.645$

Answer: D

15. Which of the following statements is false with regards to the width of a confidence interval?

- a. The sample mean from which the interval is constructed is located half way between the boundaries of the confidence interval
- b. The width of the interval increases when the sample size is decreased
- c. The width of the interval decreases when the significance level is increased
- d. The width of the interval decreases when the sample mean is decreased
- e. The width of the interval increases when the confidence level is increased

Answer: D

16. After constructing a confidence interval estimate for a population mean, you believe that the interval is useless because it is too wide. In order to correct this problem, you need to:

- a. Increase the population standard deviation
- b. Increase the sample size
- c. Increase the level of confidence
- d. Increase the sample mean
- e. Decrease the sample size

Answer: B

17. The problem with relying on a point estimate of a population parameter is that the point estimate

- a. has no variance
- b. might be unbiased
- c. might not be relatively efficient
- d. does not tell us how close or far the point estimate might be from the parameter
- e. may not be consistent

Answer: D

18. A federal auditor for nationally chartered banks from a random sample of 100 accounts found that the average demand deposit balance at the First National Bank of a small town was R549.82. If the auditor needed a point estimate for the population mean for all accounts at this bank, what would she use?

- a. The average of R549.82 for this sample.
- b. The average of R54.98 for this sample.
- c. There is no acceptable value available.
- d. She would survey the total of all accounts and determine the mean.
- e. The mean would be impossible to calculate without further information

Answer: A

19. Which one of the statements below is correct?

- a. If the significance level is equal to 0.1, it implies that we are 10 % confident that the population mean will lie between the confidence limits
- b. If the sample size increases the confidence interval becomes wider
- c. As the population standard deviation increases, the confidence interval becomes narrower
- d. A 90 % confidence interval for the population mean is narrower than a 95 % confidence interval for the population mean
- e. Increasing the significance level increases the width of the confidence interval

Answer: D

20. Sand is packed into bags which are then weighed on scales. It is known that if full bags of sand are intended to weigh  $\mu$  kg, then the weight recorded by the scales will be normally distributed with a mean  $\mu$  kg and a standard deviation of 0.36kg. A particular bag of sand was weighed four times and the weight recorded each time was different. The sample mean weight was recorded as 34.7kg. What is a 95 % confidence interval for the true weight of the full bag of sand?

- a. 34.35 to 35.05kg
- b. 35.85 to 36.55kg
- c. 34.21 to 35.19kg
- d. 34.48 to 34.92kg
- e. 37.75 to 38.45kg

Answer: A

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