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DIMENSIONLESS TECHNOLOGY

Problem Set- Lesson 8

Q1:-

What is the main problem with point estimates of population parameters?

- ☐ Nothing, point estimates are 100% accurate estimates of their respective population parameters
- ☐ They do not account for sampling error
- ☐ They tell us nothing about the population parameters they are estimating
- ☐ We can't use them to estimate population means

Q2:-

Which has a larger range, n and σ held constant?

95% Confidence interval
98% confidence interval

Q3:-

As the sample size increases, the range of the confidence interval

- ☐ decreases
- ☐ increases
- ☐ remains constant

Q4:-

As the population standard deviation increases, the range of the confidence interval

- ☐ decreases
- ☐ increases
- ☐ remains constant

Q5:-

A population is normally distributed with standard deviation 2.8. Compute the 95% confidence interval for the mean, based on the following random sample (n = 6):

8, 9, 12, 13, 14, 16

(Hint: First find the sample mean.)

(_____ , _____)
lower bound , upper bound

Q6:-

A chemistry teacher wants to improve exam scores by incorporating more interactive in-class activities. The mean exam score for all her previous classes is 68% with standard deviation 10%. After trying out the interactive in-class activities for her current class, this class got a score of 75%. There were 25 students in the class. She decides to calculate a 95% confidence interval for what the average exam score would be if she continued this method for all classes.

What are the critical values of z for a 95% confidence interval?

$\pm$ [ ]

Q7:-

What is the standard error of the mean? %

(For previous data)

Q8:-

What is the probability of obtaining this mean (75%) or greater?

Q9:-

What is the margin of error (half the width of the 95% confidence interval)? %

Q10:-

What is the confidence interval? (_____, _____)

Q11:-

Referring to the previous example, what does this confidence interval tell us about the effects of incorporating more in-class interactive activities? (Check all that apply.)

- ☐ The new way of teaching is likely not more effective than the old way.
- ☐ The new way of teaching is likely more effective than the old way.
- ☐ If she continued this new way of teaching, the mean exam score for all future students would likely be between about 71% and 79%.
- ☐ If she continued this new way of teaching, the mean exam score for all future students would likely be greater than 79%.
- ☐ If she continued this new way of teaching, the mean exam score for all future students would likely be less than 71%

Q12:-

A medical doctor wants to reduce blood pressure in his hypertensive patients by teaching them to meditate. He finds that the mean systolic blood pressure for the population of Stage 2 hypertensive patients (those with high blood pressure) is 180 mmHG ($\mu = 180$) with a standard deviation of 18 mmHG ($\sigma = 18$). After teaching a sample of 9 patients to meditate, he obtains a sample mean of 175. If he taught all his patients to meditate, could it reduce their average blood pressure? To answer this, he decides to calculate a 99% confidence interval for this average.

What are the critical values of z? $\pm$ ☐

Q13:-

What is the standard error of the mean?

Q14:-

What is the probability of obtaining this mean (175 mmHG) or lower?

Q15:-

What is the margin of error? (Half the width of the CI)

Q16:-

What is the confidence interval?

(_____, _____)

Q17:-

Referring to the previous example, what does this CI tell us about the effects of meditation on blood pressure?

- ☐ The doctor has good evidence that meditation reduces blood pressure.
- ☐ These data do not provide good evidence that meditation reduces blood pressure.
- ☐ If the doctor had all his future patients meditate the same way as his sample, the mean blood pressure would likely fall between 160 and 190 mmHG.
- ☐ If the doctor had all his future patients meditate the same way as his sample, the mean blood pressure would likely fall below 160 mmHG.