Lesson Five Practice Assignment
Confidence Intervals

1. The mean of the sampling distribution of $\bar{x}$ is always equal to

    a) μ

    b) $Z_{\frac{\alpha}{2}}$

    c) $\frac{\sigma}{\sqrt{n}}$

2. The standard deviation of the sampling distribution of the sample mean decreases when

    a) *x* increases

    b) *n* increases

    c) *n* decreases

3. When samples are selected from a normally distributed population, the sampling distribution of the sample mean has a normal distribution

    a) if $n \geq 30$

    b) if $n \geq 100$

    c) all the time

4. When samples are selected from a non-normally distributed population, the sampling distribution of the sample mean has a normal distribution

    a) if $n \geq 30$

    b) if $n \geq 100$

    c) all the time

5. Determine $Z_{\frac{\sigma}{2}}$ for the following to two decimal places:

    a. $Z_{\frac{\sigma}{2}}$ for 94% confidence interval

    b. $Z_{\frac{\sigma}{2}}$ for 88% confidence interval

6. Determine the 92% confidence interval for μ if $\sigma = 4$, $\bar{x} = 76$, and $n = 120$.

7. A study of 50 English teachers found the average time spent marking a term paper was 15.2 minutes with a standard deviation of 2.8 minutes. Find a 95% confidence interval of the mean time for all term papers. (Note: round invNorm answer to 2 decimal places for your calculations)

8. Federal fisheries employees accompany large commercial fishing boats during openings. A random sample of 100 spring salmon yielded a mean length of 52 cm with a standard deviation of 5.1 cm. Find a 94% confidence interval for the mean length of all the spring salmon caught by the crew.

9. A real-estate firm in Winnipeg takes a random sample of 60 homes. This sample yields a mean of 1800 square feet of living space with a standard deviation of 280 square feet. Construct a 99% confidence level for the mean square footage of living space for all Winnipeg homes. (Note: round invNorm answer to 2 decimal places for your calculations)

10. Find the sample size necessary to estimate a population mean to within 2 units if $\sigma = 12$. We want 86% confidence level in our results.

11. A study of 50 people living in Crescent Beach, BC, showed the average age as 42 years with a standard deviation of 12 years. (Note: round invNorm answer to 2 decimal places for your calculations)

     a) Find the 95% confidence interval of the mean age for all the people living in Crescent Beach.

     b) If the 95% confidence interval of the study stays the same, but we have 100 people instead of 50, what happens to the confidence interval? Why?

12. A random sample of 400 passengers that arrive at Vancouver International Airport has a mean processing time of 45 minutes with a standard deviation of 12 minutes.

     a) Construct a 98% confidence interval for the mean arrival time for all passengers

     b) If the range you obtained in part a) is larger than you want, how can you narrow it?

13. The confidence interval $76.59 < \mu < 79.41$ is found by using a random sample for which $\bar{x} = 78, \sigma = 8$ and $n = 70$. Determine the degree of confidence.

ANSWERS

1. a
2. b
3. c
4. a
5a. $\pm$ 1.88
5b. $\pm$ 1.55
6. $75.36 < \mu < 76.64$
7. $14.46 < \mu < 15.94$
8. $51.04 < \mu < 52.96$
9. $1706.9 < \mu < 1892.9$
10.   Sample size needs at least 79
11a. $38.69 < \mu < 45.31$
11b. The confidence interval gets smaller because as the sample size
     increases the closer you get to the population mean
12a. $43.6 < \mu < 46.4$
12b.   Accept a lower confidence level or increase the sample size
13.   Confidence interval would be 86%