Quiz 8, Confidence Intervals Name: _____ Grade: _____

The following problem is associated with questions 1 to 5:

JMU Parking Services is interested in the overall average dollar amount of a ticket during the school year. It has been known that the dollar amount of a ticket is normally distributed with a standard deviation of $20. A random sample of 16 tickets is taken with a mean of $25.

1. Which of the following statement is correct?
   a). t score should be used because the population is normal and the population standard deviation is known.
   b). t score should be used because the sample size is small (<30).
   c). z score should be used because the population is normal and the population standard deviation is known.
   d). z score should be used because the population is normal and the sample size is small (<30).

2. Construct a 95% confidence interval for the mean dollar amount of a ticket.
   a). 15.2 and 34.8 b). 16.8 and 33.2 c). 13.8 and 36.2 d). 22.55 and 27.44

3. Assume the confidence interval is between $18 and $28, which of the following interpretations is correct?
   a). 95% of the sampled dollar amount of tickets fell between $18 and $28.
   b). We are 95% confident that the mean of the sampled dollar amount of tickets falls in the interval $18 and $28.
   c). In the population of dollar amount of tickets, 95% of them will have dollar amount that fall in the interval $18 and $28.
   d). We are 95% confident that the true unknown average dollar amount of tickets falls in the interval $18 and $28.

4. Suppose the 95% confidence interval for μ has been constructed. If it is decided to take a larger sample and to decrease the confidence level of the interval, then the resulting interval width would _____ ___. (Assume that the sample statistics gathered would not change very much for the new sample.)
   a) be larger than the current interval width
   b) be narrower than the current interval width
   c) be the same as the current interval width
   d) be unknown until actual sample sizes and reliability levels were determined

5. Suppose JMU Parking Services wants to take a larger sample with a confidence level of 95% and the control the margin of error to be $6. What is the sample size?
   a). 43 b). 31 c). 256 d). 31

The following problem is associate with questions 6 to 9:

A confidence interval was used to estimate the proportion of COB191 students that are freshmen. A random sample of 100 COB191 students was taken and 35 of them were identified as freshmen.

6. Construct a 90% confidence interval for the proportion of COB191 students that are freshmen.
   a). 21% and 39% b). 27.15% and 42.85% c). 19.7% and 40.3% d). 25.4% and 34.6%

7. Suppose the following 95% confidence interval: (26%, 44%) is constructed. Based on the interval above, is the population proportion of freshmen in COB191 equal to 40% in COB191 classes?
   a). No, and we are 95% sure of it.
   b). No. The proportion is 37.5%.
   c). Maybe. 40% is a believable value of the population proportion based on the information above.
   d). Yes, and we are 95% sure of it.

8. Using the information that 35 out of 100 COB191 students are freshmen, what size sample would be necessary if we wanted to estimate the true proportion to within ±0.05 using 90% confidence?
   a). 247 b). 246.2 c). 350 d). 62

9. The width of the confidence interval estimate for the proportion of freshmen in COB191 will be
   a). narrower for 99% confidence than for 95% confidence.
   b). wider for a sample size of 100 than for a sample size of 50.
   c). narrower when the sample proportion is 0.50 than when the sample proportion is 0.20.
   d). narrower for 90% confidence than for 95% confidence.

The following problem is associated with questions 10 to 15:

The director of RMH wishes to estimate the mean number of people who are admitted to the emergency room during a 24-hour period. The director randomly selects 9 different 24-hour periods and determines the number of admissions for each. For this sample $\bar{X} = 19.8$ and $s^2 = 25$. It is known that the population of number of people admitted to the emergency room during a 24-hour period is normally distributed.

10. Which statement is correct in determining the use of t score?
   a). The population is normally distributed, its standard deviation is known and the sample size is large..
   b). The population is normally distributed, its standard deviation is known and the sample size is small.
   c). The population is normally distributed, its standard deviation is unknown and the sample size is small.
   d). Regardless the population distribution, its standard deviation is unknown and the sample size is small.

11. To construct a 95% confidence interval to estimate the mean number of admissions per 24-hours period, which statement is correct when you try to find the z or t score on the Table?
   I. the degree of freedom df = 9
   II. the upper tail used in the chart should be 0.025
   III. the degree of freedom df = 8
   IV. the upper tail used in the chart should be 0.05
   V. the value should be 1.96
   a). V b). I and II only c). III and IV only d). II and III only

12. What is the standard error of the mean number of people who are admitted to the emergency room during a 24-hour period?
   a). 0.556 b). 1.667 c). 2.778 d). 1.768

13. The Excel function to find the z or t score can be given as:
   a). =TINV(0.05,8) b). =TINV(0.025,8) c). =NORMSINV(0.975) d). =TINV(0.05,9)

14. Construct the 95% confidence interval to estimate the mean number of admissions per 24-hour period.
   a). 16.53 and 23.07 b). 15.96 and 23.64 c). 16.03 and 23.57 d). 17.06 and 22.54