**Alg II CC: Test** **Name _____Pd. _____**
**Unit 1: Inference & Confidence**

1. Find the critical value, $z_c$, that corresponds to a 94% confidence interval.

A. 2.33 B. 1.96 C. 1.88 D. 1.645

2. A random sample of 150 students has a grade point average with a standard deviation of 0.78. Find the margin of error of the estimate if $c = 0.95$.

A. 0.1048 B. 0.1104 C. 0.1248 D. 0.1640

3. A random sample of 40 students has a test score with $\bar{x} = 81.5$ and $s = 10.2$. Construct the confidence interval for the population mean, $\mu$, if $c = 0.90$.

A. $(51.8, 92.3)$ B. $(78.8, 84.2)$ C. $(66.3, 89.1)$ D. $(71.8, 93.5)$

4. From a random sample of 36 days in a recent year, the closing stock prices for Hasbro had a mean of $24.63 and a standard deviation of $1.26. Which of the following confidence levels would construct the widest interval?

A. 96% B. 95% C. 92% D. 98%

5. In a random sample of 60 computers, the mean repair cost was $150 with a standard deviation of $36. Construct a 99% confidence interval for the population mean.

A. $(\$138, \$162)$ B. $(\$18, \$54)$ C. $(\$238, \$274)$ D. $(\$537, \$654)$

6. A nurse at a local hospital is interested in estimating the birth weight of infants. How large a sample must she select if she decides to be 95% confident that the true mean is within 3 ounces of the sample mean? The standard deviation of birth weights is known to be 7 ounces.

A.11 B. 21 C. 212 D. 512

7. If a confidence interval is given to be (53, 75), find the mean and margin of error.

A. 75, 22 B. 53, 22 C. 64, 11 D. 64, 22

8. Find the critical value, $t_c$, for $c = 0.90$ and $n = 15$.

A. 1.345 B. 2.145 C. 2.624 D. 1.761

9. Find the value of *E*, the maximum error of estimate, for $c = 0.95$ and $n = 16$ and $s = 2.4$.

A. 1.28 B. 1.96 C. 0.28 D. 2.56

10. Construct a 95% confidence interval for the population mean, $\mu$. Assume the population has a normal distribution. A sample of 20 college students had a mean annual earnings of $3120 with a standard deviation of $677.

A. $(\$1324, \$1567)$ B. $(\$2135, \$2567)$ C. $(\$2657, \$2891)$ D. $(\$2803, \$3437)$

11. Construct a 95% confidence interval for the population mean, $\mu$. Assume the population has a normal distribution. A random sample of 16 florescent light bulbs has a mean life of 645 hours with a standard deviation of 31 hours.

A. $(628.5, 661.5)$ B. $(876.2, 981.5)$ C. $(531.2, 612.9)$ D. $(321.7, 365.8)$

12. If the sample size for a t-distribution is 75, how many degrees of freedom does the distribution have?

A. 75 B. 74 C. 76 D. none

13. As the sample size increases, the margin of error

A. increases B. decreases C. stays the same

14. As the standard deviation decreases, the confidence interval

A. widens B. becomes more narrow C. stays the same

15. As the confidence level is increased, the margin of error

A. increases B. decreases C. stays the same

16. A local bank needs information concerning the checking account balances of its customers. A random sample of 15 accounts were checked. The mean balance was \$686.75 with a standard deviation of \$256.20. Find a 95% confidence interval for the true mean. Assume that the account balances are normally distributed. (Show all work.)

17. You want to estimate the mean repair cost for dishwashers. The estimate must be within \$10 of the population mean. Determine the required sample size to construct a 99% confidence interval for the population mean. Assume the population standard deviation is \$22.50. (Show all work.)

**For problems 18 – 20, should you use a normal distribution or a t-distribution to work the problem? Explain your answer.**

18. In a random sample of 15 CD players brought in for repair, the average repair cost was \$80 and the standard deviation was \$14. Construct a 90% confidence interval for $\mu$. Assume the repair costs are normally distributed.

19. A random sample of 25 gas grills has a mean price of $280.90. From past studies, it is known that the repair costs are normally distributed with a population standard deviation of $123.50. Find the maximum error of a 96% confidence interval.

20. In 36 randomly selected seawater samples, the mean sodium chloride concentration was 23 cc/cubic meter and the standard deviation was 6.7 cc/cubic meter.

**BONUS 5 points: You must show all work to receive credit.**
A paint manufacturer uses a machine to fill gallon cans with paint. The manufacturer took a sample of 40 cans and calculated the mean and standard deviation. They were not satisfied with their results. They wanted to estimate the mean volume of paint the machine is putting in the cans within 0.15 ounce. How many additional cans would need to be in the sample if you want to construct a 90% confidence interval and remain within 0.15 ounces of the mean volume? (Assume the population standard deviation is 0.85 ounce.)