Unit 1 Quiz 1: Confidence Intervals for Means – A

Name(s): _____ **Date:** _____ **Period:** _____

_____ ***Show and label all work for each problem to receive

_____ *credit. Keep 4 decimals during; round to 2 at end.***

Confidence Interval: $\bar{x} \pm E$

where $E = z^* \frac{\sigma}{\sqrt{n}}$ if σ is known and either $n \geq 30$ or Population is Normally Distributed

OR $E = z^* \frac{s}{\sqrt{n}}$ if σ is unknown and $n \geq 30$

Level of confidence	Critical Value, z^*
90%	1.645
95%	1.96
99%	2.575

1.) An EOCT has results that are heavily skewed right due to a few students achieving near perfect scores. In order to predict what the population mean score would be the state takes a random sample of 100 tests. The sample has a mean of 82 with a standard deviation of 7. Construct and interpret a 95% confidence interval for the true population mean score.

Interpretation: _____

_____

2.) A random sample of 49 shoppers showed that they spend an average of $23.45 per visit at the Saturday Mornings Bookstore. The standard deviation of the sample was $2.80. Find and interpret the 99% confidence interval of the true mean spent by shoppers. Assume the population is normally distributed.

Interpretation: _____

_____

3.) On a standardized test the population standard deviation is known to be 135. Assuming that the test scores are normally distributed, find a 90% confidence interval for the population mean if a random sample of 20 tests are scored and had an mean score of 1435.

Interpretation: _____

_____

****EXTRA CREDIT****

A.) **(4 points)** A tire manufacturer wants to examine their tires to make sure that the average tire lasts 40,000 miles. Previous research shows that the standard deviation of the population is 1200 miles. They want to be 95% confident that the true mean is within 100 miles of 40,000 miles. What size sample should be used? Justify your answer with sufficient work.

A.) ANSWER: _____

B.) **(2 points)** Find the z^* for a 92% confidence interval.

B.) ANSWER: _____

C.) **(2 points)** Suppose we are planning on taking an SRS from a population. If $\sigma_{\bar{x}}$ is reduced by a factor of $1/3$, then the sample size was _____ by a factor of _____.