Math 13 - Homework 9

Name: _____ **Class Number:** _____

1) Given the following information, determine the 98% confidence interval estimate of the population mean: $\bar{x} = 500$, $\sigma = 12$, $n = 5$

2) The mean of a random sample of 25 observations from a normal population with a standard deviation of 50 is 200.

a. Estimate the population mean with 95% confidence.
b. Repeat part a) changing the population standard deviation to 25.
c. Repeat part a) changing the population standard deviation to 10.
d. Describe what happens to the confidence interval estimate when the standard deviation is decreased.

3) A scientist randomly sampled 100 observations from a population with a standard deviation of 5 and found that $\bar{x}$ is 10.

a. Estimate the population mean with 90% confidence.
b. Repeat part a) with a sample size of 25.
c. Repeat part a) with a sample size of 10.
d. Describe what happens to the confidence interval estimate when the standard deviation is decreased.

4) A scientist would like to estimate a population mean to within 10 units. The confidence level has been set at 95% and $\sigma = 200$. Determine the sample size n

5) The operations manager of a large production plant would like to estimate the average amount of time workers take to assemble a new electronic component. After observing a number of workers assembling similar devices, she guesses that the standard deviation is 6 minutes. How large a sample of workers should she take if she wishes to estimate the mean assembly time to within 20 seconds? Assume that the confidence level is to be 99%.

6) A medical researcher wants to investigate the amount of time it takes for pateints' headache pain to be relieved after taking a new prescription painkiller. She believes that the population is normally distributed with a standard deviation of 20 minutes. How large a sample should she take to estimate the mean time to within 1 minute with 90% confidence?