* 1. **Confidence Intervals and Sample Size For Means**

**Warmup**

You work for a consumer advocate agency and want to find the mean repair cost of a washing machine. As part of your study, you randomly select 40 repair costs and find the mean to be $100.00. From past studies, you assume that the σ is $17.50.

Construct a 90% confidence interval. (Include all three steps: check conditions, calculate the CI, and interpret it).

**Confidence Intervals for Means**



**Example #1**

Researchers would like to estimate the mean cholesterol level *µ* of a particular variety of monkey that is often used in laboratory experiments. The standard deviation of cholesterol level is 5 mg/dl. A random sample of 40 monkeys was used and the sample mean was 53 mg/dl. Construct a 98% confidence interval for the mean cholesterol level of this type of monkey.

**Example #2**

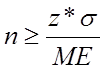
Assume that systolic blood pressure (SBP) for healthy adults is normally distributed with σ = 20 mm Hg. If an SRS of 20 adults is selected and the mean of the sample is 118 mm HG, construct a 99% confidence interval for the mean systolic blood pressure of all adults

**Choosing a Sample Size**

The margin of error ME of the confidence interval for the population mean µ is:



We determine a sample size for a desired margin of error when estimating a mean in much the same way we did when estimating a proportion.



If the result for n has a decimal, you move the value of n to the next highest whole number.

**Example #1**

Researchers would like to estimate the mean cholesterol level µ of a particular variety of monkey that is often used in laboratory experiments. They would like their estimate to be within 1 milligram per deciliter (mg/dl) of the true value of µ at a 95% confidence level. A previous study involving this variety of monkey suggests that the standard deviation of cholesterol level is about 5 mg/dl. How many monkeys are required for the study?

**Example #2**

Assume that systolic blood pressure (SBP) for healthy adults is normally distributed with

σ = 20 mm Hg. What sample size is needed so that 95% of sample means are between 116 mmHg and 124 mmHg?