1. The owner of a popular chain of restaurants wishes to know if completed dishes are being delivered to the customer's table within one minute of being completed by the chef. A random sample of 75 completed dishes found that 60 were delivered within one minute of completion. Find the 95% confidence interval for the true population proportion.

2. An asbestos removal company places great importance on the safety of their employees. The protective suits that the employees wear are designed to keep asbestos particles off the employee's body. The owner is interested in knowing the average amount of asbestos particles left on the employee's skin after a day's work. A random sample of 100 employees had skin tests after removing their protective suit. The average number of particles found was .481 particles per square centimeter. Assuming that the population standard deviation is 0.35 particles per square centimeter, calculate a 95% confidence interval for the number of particles left on the employee's skin.

3. A biology student at a major university is writing a report about bird watchers. She has developed a test that will score the abilities of a bird watcher to identify common birds. She collects data from a random sample of people that classify themselves as bird watchers (data shown below). Find a 90% confidence interval for the mean score of the population of bird watchers.

4.5	*9.1*	*8*	*5.9*	*7.0*	*5.2*	*7.3*	*7.0*	*6.6*	*5.1*
7.6	*8.2*	*6.4*	*4.8*	*5.8*	*6.2*	*8.5*	*7.3*	*7.8*	*7.4*

Confidence Interval Type	Formula	Conditions	Calculator Test
Proportions	$\hat{p} \pm (z^*)\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$	1. The sample is a simple random sample. 2. The population is large relative to the sample $10n < N$ 3. $np \geq 10$ $n(1-p) \geq 10$	1-PropZInterval
Means (σ known)	$\bar{x} \pm (z^*)\left(\frac{\sigma}{\sqrt{n}}\right)$	1. The sample is a simple random sample. 2. The population is normal or $n \geq 30$ 3. The population standard deviation (σ) is known.	ZInterval
Means (σ unknown)	$\bar{x} \pm (t^*)\left(\frac{s}{\sqrt{n}}\right)$	1. The sample is a simple random sample. 2. The population is approximately normal (graphical support required) or $n \geq 40$ 3. The population standard deviation (σ) is unknown.	TInterval

State: One would like to estimate the **true** mean/proportion (context) *μ/p (hat)* of all the (context) at a (# c level) % confidence level.

Example: We want to estimate the true mean tension μ of all the video terminals produced this day at a 90% confidence level.

Plan: If the conditions are met, one can use a (one proportion z interval, one sample z interval, or one-sample *t* interval ***pick one***) to estimate *μ/p hat*.

Random – The problem stated the sample was randomly selected.

Normal – See Chart Above #2 in the conditions

Independent - Because sampling was done without replacement, one must check the 10% condition and assume that at least 10(n) = ? (context). # is less than 10% of population.

Example: The responses need to be independent or one response does not affect another.

Independent has 2 parts, < 10% of population and if the responses affect each other

Do: statistic ± (critical value) (standard deviation of statistic) (See formula box above)

You must show work or clearly state your method so it is easily replicated: (Example Below)

Do: Critical t for 99% confidence and 29 df is 2.756, so the 99% confidence interval is

$1.267 \pm 2.756\left(\frac{1.23}{\sqrt{30}}\right) \rightarrow 1.267 \pm 0.619 \rightarrow (0.648, 1.886)$

or Using statistical softerware the function TInterval input the statistics x = 1.267, sx = 1.23, n = 30, with .99 confidence results in the interval (.64801, 1.886).

(for above press Stats, over to Tests, down to 8:TInterval input stats)

Conclude: One is (#)% confident that the interval ___ to ___ contains the true mean/p hat (context).

EX: One is 99% confident that the interval 0.648 to 1.886 contains the true mean score on this question.