A sampling distribution (for the mean) is a frequency distribution created by using the mean of repeated samples as data points for the distribution.

Two important properties of a sampling distribution for the mean are:

1. $\mu_{-} = \mu$

2. $\sigma_{-} = \frac{\sigma}{\sqrt{n}}$

Suppose random samples are chosen from a population that has an unknown distribution, but has a known mean and standard deviation.

1. If samples of size n > 30 are drawn then the sampling distribution of sample means will form a normal distribution.

2. If the original population is approximately normal, then samples of any size will form a normal distribution.

To calculate normal probabilities related to a sample mean of n items, rather than a single item, we can use the same normalcdf function in the calculator with 4-inputs, but the last input needs to be: $\sigma/\sqrt{\mathbf{n}}$ **.**

normalcdf (lower-$\bar{\mathbf{x}}$, upper-$\bar{\mathbf{x}}$, μ, $\sqrt{}$

2. The average age of a vehicle registered in the United States is 96 months (8 years). Assume the standard deviation to be 16 months. If a random sample of 36 cars is selected, find the probability that the mean age of the sample is between 90 and 100 months.

3. According to Runner's World magazine, the finishing times of all the 10K races they have tracked in the last 10 years are normally distributed with a mean of 61 minutes and a standard deviation of 9 minutes. If samples of 12 runners are taken, what percentage of mean finishing times will be below 58 minutes?

4. According to the U.S. Department of Agriculture, the mean daily calorie intake of males aged 20 to 39 years old is 2716 calories with a standard deviation of 72.8 calories. Assuming the distribution of calorie intake forms a normal distribution, what is the probability that a mean of a random sample of 25 males is 2750 calories and higher?