A population of scores forms a normal distribution with a mean of $\mu = 60$ and a standard deviation of $\sigma = 12$. Consider a sample of $N = 36$ scores.

- What is the probability that a *single score* in the sample is greater than 64?
- What is the probability that the *sample mean* greater than 64?

A population of scores forms a normal distribution with a mean of $\mu = 80$ and a standard deviation of $\sigma = 10$.

- What is the probability of obtaining a sample mean greater than 85 for a sample of $N = 9$ scores?
- What is the probability of obtaining a sample mean greater than 85 for a sample of $N = 36$ scores?
- For a sample of $N = 16$ scores, what is the probability that the sample mean will be within 5 points of the population mean?

The scores on a standardized mathematics test form a normal distribution with a mean of $\mu = 70$ and a standard deviation of $\sigma = 10$.

- What proportion of the students in the state have scores less than $X = 75$?
- If samples of $N = 4$ are selected from the population, what proportion of the samples will have means less than $\overline{X} = 75$?
- If samples of $N = 25$ are selected from the population, what proportion of the samples will have means less than $\overline{X} = 75$?

The machinery at a food-packing plant is able to put exactly 12 ounces of juice in every bottle. However, some items such as apples come in variable sizes so it is almost impossible to get exactly 3 pounds of apples in a bag labeled "3 lbs." Therefore, the machinery is set to put an average of $\mu = 50$ ounces (3 pounds and 2 ounces) in each bag. The distribution of bag weights is approximately normal with a standard deviation of $\sigma = 4$ ounces.

- What is the probability of randomly picking a bag of apples that weighs less than 48 ounces (3 pounds)?
- What is the probability of randomly picking $N = 4$ bags of apples that have an average weight less than 48 ounces?