5.4: Chapter 5 Key Terms

Central Limit Theorem

Given a random variable with known mean μ and known standard deviation, σ, we are sampling with size n, and we are interested in two new RVs: the sample mean, $\overline{X}$. If the size (n) of the sample is sufficiently large, then $\overline{X} \sim N\left(\mu, \frac{\sigma}{\sqrt{n}}\right)$. If the size ($n$) of the sample is sufficiently large, then the distribution of the sample means will approximate a normal distributions regardless of the shape of the population. The mean of the sample means will equal the population mean. The standard deviation of the distribution of the sample means, $\frac{\sigma}{\sqrt{n}}$, is called the standard error of the mean.

Mean

A number that measures the central tendency; a common name for mean is "average." The term "mean" is a shortened form of "arithmetic mean." By definition, the mean for a sample (denoted by $\overline{x}$) is $\overline{x} = \overline{x} = \frac{\text{Sum of all values in the sample}}{\text{Number of values in the sample}}$, and the mean for a population (denoted by μ) is $\mu = \frac{\text{Sum of all values in the population}}{\text{Number of values in the population}}$.

Normal Distribution

Notation: $X \sim N(\mu, \sigma)$ for a continuous random variable, where μ is the mean of the distribution and σ is the standard deviation. If $\mu = 0$ and $\sigma = 1$, the random variable, z, is called the **standard normal distribution**.

Sampling Distribution

Given simple random samples of size n from a given population with a measured characteristic such as mean, proportion, or standard deviation for each sample, the probability distribution of all the measured characteristics is called a sampling distribution.

Standard Error of the Mean

The standard deviation of the distribution of the sample means, or $\frac{\sigma}{\sqrt{n}}$