

## Chapter 9: Sampling Distributions



### Key Vocabulary:

- parameter
- statistic
- sampling variability
- sampling distribution
- unbiased
- central limit theorem
- law of large numbers

### Calculator Skills:

- `randNorm( $\mu$ ,  $\sigma$ , #trials)`



### 9.1 Sampling Distributions (pp.562-580)

1. Explain the difference between a *parameter* and a *statistic*?
2. What is *sampling variability*?
3. Explain the difference between  $\mu$  and  $\bar{x}$ , and between  $p$  and  $\hat{p}$ ?
4. What is meant by the *sampling distribution* of a statistic?
5. When is a statistic considered *unbiased*?
6. How is the size of a sample related to the *spread* of the sampling distribution?

## 9.2 Sample Proportions (pp.581-589)

1. In an SRS of size  $n$ , what is true about the sampling distribution of  $\hat{p}$  when the sample size  $n$  increases?
2. In an SRS of size  $n$ , what is the mean of the sampling distribution of  $\hat{p}$ ?
3. In an SRS of size  $n$ , what is the standard deviation of the sampling distribution of  $\hat{p}$ ?
4. What happens to the standard deviation of  $\hat{p}$  as the sample size  $n$  increases?
5. When does the formula  $\sqrt{\frac{p(1-p)}{n}}$  apply to the standard deviation of  $\hat{p}$ ?
6. When the sample size  $n$  is large, the sampling distribution of  $\hat{p}$  is approximately normal. What test can you use to determine if the sample is large enough to assume that the sampling distribution is approximately normal?

### 9.3 Sample Means (pp.591-604)

1. The mean and standard deviation of a population are *parameters*.  
What symbols are used to represent these *parameters*?
2. The mean and standard deviation of a sample are *statistics*.  
What symbols are used to represent these *statistics*?
3. Because averages are less variable than individual outcomes, what is true about the standard deviation of the sampling distribution of  $\bar{x}$  ?
4. What symbols are used to represent the mean and standard deviation of the sampling distribution of  $\bar{x}$  ?
5. What is the mean of the sampling distribution of  $\bar{x}$  , if  $\bar{x}$  is the mean of an SRS of size  $n$  drawn from a large population with mean  $\mu$  and standard deviation  $\sigma$ ?
6. What is the standard deviation of the sampling distribution of  $\bar{x}$  , if  $\bar{x}$  is the mean of an SRS of size  $n$  drawn from a large population with mean  $\mu$  and standard deviation  $\sigma$ ?
7. To cut the standard deviation of  $\bar{x}$  in half, you must take a sample \_\_\_\_\_ times as large.
8. When should you use  $\frac{\sigma}{\sqrt{n}}$  to calculate the standard deviation of  $\bar{x}$  ?
9. What does the **Central Limit Theorem** say about the shape of the sampling distribution of  $\bar{x}$  , no matter what shape the population distribution has?