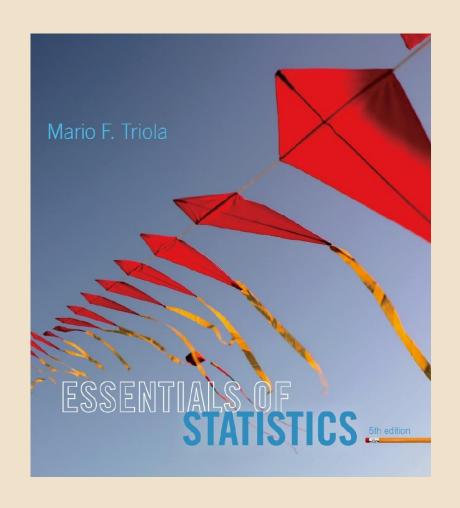
## Lecture Slides



Essentials of Statistics
5th Edition

and the Triola Statistics Series

by Mario F. Triola

# **Chapter 5 Probability Distributions**

- 5-1 Review and Preview
- 5-2 Probability Distributions
- 5-3 Binomial Probability Distributions
- 5-4 Parameters for Binomial Distributions

# **Key Concept**

In this section we consider important characteristics of a binomial distribution including center, variation and distribution. That is, given a particular binomial probability distribution we can find its mean, variance and standard deviation.

A strong emphasis is placed on interpreting and understanding those values.

### **Binomial Distribution: Formulas**

 $\mu = n \cdot p$ 

$$\sigma^2 = n \cdot p \cdot q$$

$$\sigma = \sqrt{n \cdot p \cdot q}$$

#### Where

n = number of fixed trials

p = probability of success in one of the*n*trials

q = probability of failure in one of the*n*trials

## Interpretation of Results

It is especially important to interpret results. The range rule of thumb suggests that values are unusual if they lie outside of these limits:

maximum usual value = 
$$\mu + 2\sigma$$

minimum usual value = 
$$\mu - 2\sigma$$

## **Example**

McDonald's has a 95% recognition rate. A special focus group consists of 12 randomly selected adults.

For such a group, find the mean and standard deviation.

$$\mu = np = 12(0.95) = 11.4$$

$$\sigma = \sqrt{npq} = \sqrt{12(0.95)(0.05)} = 0.754983 = 0.8$$
 (rounded)

## **Example - continued**

Use the range rule of thumb to find the minimum and maximum usual number of people who would recognize McDonald's.

$$\mu + 2\sigma = 11.4 + 2(0.8) = 13$$
 people

$$\mu - 2\sigma = 11.4 - 2(0.8) = 9.8$$
 people

If a particular group of 12 people had all 12 recognize the brand name of McDonald's, that would **not** be unusual.