

Statistics 1: Elementary Statistics

Section 5-3

Requirements for a Binomial Distribution

- **Fixed number of trials**
- **All trials are independent**
- **Each trial: two possible outcomes**
- **Probabilities same for each trial**

Requirements for a Binomial Distribution

- **Experiment:**
 - **Flip a coin until you get a “heads”**
 - **Let x = the number of flips before a heads occurs**
- **Not binomial. Why?**

Requirements for a Binomial Distribution

- **Experiment:**
 - Select 13 cards from a deck of 52
 - Let x = the number of hearts
- **Not binomial. Why?**

Requirements for a Binomial Distribution

- **Experiment:**
 - Select a car at random from each of the 50 states
 - Let x = the number of FORDs in the sample
- **Not binomial. Why?**

Requirements for a Binomial Distribution

- **Experiment:**
 - Select 20 random times during the day and check the traffic light near your house
 - Record the number of times it is red, yellow, or green
- **Not binomial. Why?**

Are these Binomial?

- The number of sixes in 10 rolls of a die
- The number of contaminated fast-food hamburgers in a random sample of 100
- The number of girls in 30 births

Notation for Binomial Distribution

- S means “success”
- F means “failure”
- $P(S) = p$
- $P(F) = 1 - p = q$

More Notation for Binomial Distribution

- n = the number of trials
- x = the number of “successes” in n trials
- $P(x)$ = the probability of exactly x successes in n trials

How do we get P(x)?
Binomial Formula

$$P(x) = {}_n C_x \cdot p^x \cdot q^{n-x}$$
