

### Class Examples 10/2/18

Example 1: Suppose that a single card is selected from a standard 52-card deck.

- Compute the probability of the event  $E = \text{"drawing a king"}$
- Compute the probability of the event  $E = \text{"drawing a king"}$  or  $F = \text{"drawing a queen"}$  or  $G = \text{"drawing a jack"}$

Ans:  $A = \frac{4}{52} = \frac{1}{13}$   
 $B = \frac{4}{52} + \frac{4}{52} + \frac{4}{52} = \frac{12}{52} = \frac{3}{13}$

Example 2: Suppose a single card is selected from a standard 52-card deck. Compute the probability of the event  $E = \text{"drawing a king"}$  or  $F = \text{"drawing a diamond"}$ .

Ans:  $\frac{4}{52} + \frac{13}{52} - \frac{1}{52}$   
 $= \frac{16}{52} = \frac{4}{13}$

Example 3: According to the National Gambling Impact Study Commission, 52% of Americans have played state lotteries. What is the probability that a randomly selected American has not played a state lottery?

$P(E) = .52$   
 $P(E^c) = .48$

Example 4: Determine if the following events are independent or not.

- a) Suppose you flip a coin and roll a die. Are the events "obtain a head" and "roll a 5" independent? *Yes*
- b) Are the events "earned a bachelor's degree" and "earn more than \$100,000 per year" independent? *NO*
- c) Two 24-year old male drivers who live in the United States are randomly selected. Are the events "male 1 gets in a car accident" and "male 2 gets in a car accident" independent? *NO*

Example 5: In the game of roulette, the wheel has slots numbered 0, 00, and 1 through 36. A metal ball rolls around a wheel until it falls into one of the numbered slots. What is the probability that the ball will land in the slot numbered 17 two times in a row?

$E =$  "17 on first spin"  
 $F =$  "17 on 2nd spin"

$$P(E) \cdot P(F) = \frac{1}{38} \cdot \frac{1}{38}$$
$$= \frac{1}{1444}$$

Example 6: The probability that a randomly selected 24-year-old male will survive the year is 0.9986 according to the National Vital Statistics Report.

- a) What is the probability that three randomly selected 24-year old males will survive the year?
- b) What is the probability that 20 randomly selected 24-year-old males will survive the year?

Example 7: Compute the probability that at least one male out of 1000 aged 24 years will die during the course of the year if the probability that a randomly selected 24-year-old male survives the year is 0.9986.

