

**Statistics**  
**Fall 2022**  
**Lecture 13**



Feb 19-8:47 AM

Suppose  $P(A) = .4$

find  $P(\bar{A}) = 1 - P(A) = \boxed{.6}$

find odds in favor of event A.

$P(A) : P(\bar{A}) \rightarrow \boxed{2 : 3}$

find odds against event A.

$.4 : .6$

$\boxed{3 : 2}$

Nov 14-6:00 AM

A box has 2 quarters, 8 dimes, and 15 nickels

$$P(\text{Select a nickel}) = \frac{15 \text{ Total Nickels}}{25 \text{ Total Coins}} = \frac{3}{5}$$

odds in favor of selecting dime or nickel

$$\# \text{ dime or nickel} : \# \text{ dime or nickel}$$

$$23 : 2$$

odds against selecting a quarter.

$$\# \text{ Quarter} : \# \text{ Quarter}$$

$$23 : 2$$

Nov 14-6:03 AM

odds in favor of event A are 1 : 49.

$$1) P(A) = \frac{1}{1+49} = \frac{1}{50}$$

$$2) P(\bar{A}) = \frac{49}{1+49} = \frac{49}{50}$$

3) odds against event A.

$$49 : 1$$

Reverse it

Nov 14-6:09 AM

Given  $P(A) = .6$  ,  $P(B) = .2$   
 $A \& B$  are independent events

1)  $P(\bar{A}) = 1 - P(A) = \boxed{.4}$       2)  $P(\bar{B}) = 1 - P(B) = \boxed{.8}$

3)  $P(A \text{ and } B) = P(A) \cdot P(B) = (.6)(.2) = \boxed{.12}$   
 Addition Rule

4)  $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$   
 $= .6 + .2 - .12 = \boxed{.68}$

$P(A \text{ only}) = .6 - .12 = .48$        $1 - [.48 + .12 + .08] = .32$   
 $P(B \text{ only}) = .2 - .12 = .08$        $1 - .68 = \boxed{.32}$

Nov 14-6:14 AM

Suppose we toss a loaded coin twice.  
 Not a fair coin  
 $P(T) = .7$  ,  $P(H) = .3$

Sample Space  
 TT      TH      HT      HH

These outcomes are independent events.

$P(2 \text{ Tails}) = P(TT) = (.7)(.7) = \boxed{.49}$   
 $P(1 \text{ Tail; 1 Head}) = P(TH \text{ or } HT) = 2(.7)(.3) = \boxed{.42}$   
 $P(0 \text{ tails}) = P(HH) = (.3)(.3) = \boxed{.09}$

Tree Diagram

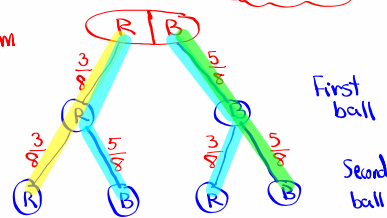
$P(TT) = (.7)(.7) = \boxed{.49}$

Nov 14-6:21 AM

A box has 3 red & 5 blue balls.

Randomly draw 2 balls with replacement.

Tree Diagram



$$P(RR) = \frac{3}{8} \cdot \frac{3}{8} = \frac{9}{64}$$

$$P(RB \text{ or } BR) = 2 \cdot \frac{3}{8} \cdot \frac{5}{8} = \frac{30}{64}$$

$$P(BB) = \frac{5}{8} \cdot \frac{5}{8} = \frac{25}{64}$$

Verify that Total Prob = 1

$$\frac{9}{64} + \frac{30}{64} + \frac{25}{64} = \frac{64}{64} = 1$$

SG 12 Make Sure to watch all videos on right side of SG 10 to SG 13.

Nov 14-6:30 AM