

## Simple Probability and Odds

### PROBABILITY

$$\text{Probability} = \frac{\# \text{ of favorable outcomes}}{\# \text{ of possible outcomes}}$$

Example: A die is rolled. Find:

a) rolling a 2:

$$P(2) = \frac{1}{6} \quad \begin{array}{l} \leftarrow \text{one 2 on the die} \\ \leftarrow \text{six outcomes} \end{array}$$

$$\begin{array}{l} \text{b) } P(1 \text{ or } 5) = \frac{2}{6} \\ \quad \quad \quad \boxed{= \frac{1}{3}} \end{array} \quad \left. \vphantom{\begin{array}{l} P(1 \text{ or } 5) \\ = \frac{2}{6} \\ = \frac{1}{3} \end{array}} \right\} \text{Reduce}$$

$$\begin{array}{l} \text{c) } P(\text{not } 1 \text{ or } 5) = \frac{4}{6} \\ \quad \quad \quad \boxed{= \frac{2}{3}} \end{array}$$

Note:

$P(1 \text{ or } 5)$  and  $P(\text{not } 1 \text{ or } 5)$   
are complements of each other.

$$\text{d) } P(7) = \frac{0}{7} = 0$$

A bowl contains 5 red chips, 7 blue chips, 6 yellow chips, and 10 green chips. Find:

$$a) P(\text{blue}) = \frac{7}{28} = \boxed{\frac{1}{4}}$$

$$b) P(\text{not green}) = \frac{18}{28} = \boxed{\frac{9}{14}}$$

## FUNDAMENTAL COUNTING PRINCIPLE

A school has baseball caps in blue, yellow, or white. The caps either have the school initials or mascot. Find the total number of possible caps.

Method #1 - Tree Diagram

Blue  $\left\{ \begin{array}{l} \text{Initials} \\ \text{Mascot} \end{array} \right.$

Yellow  $\left\{ \begin{array}{l} \text{Initials} \\ \text{Mascot} \end{array} \right.$

White  $\left\{ \begin{array}{l} \text{Initials} \\ \text{Mascot} \end{array} \right.$

6 possibilities

Method #2 - Fundamental Counting Principle  
 • Multiply your number of options.

(# of colors)(# of logos)

(3)(2)

$\boxed{= 6 \text{ possibilities}}$

ODDS

$$\text{odds} = \frac{\# \text{ of favorable outcomes}}{\# \text{ of remaining outcomes}}$$

Roll a die. Find the odds of:

a) rolling a 3.

$$\frac{1}{5}$$

← one 3

← the remaining numbers

b) rolling a 2 or 6.

$$\frac{2}{4} = \left( \frac{1}{2} \right)$$