

1) List the outcomes of the following scenarios:

Rolling a 6-sided die

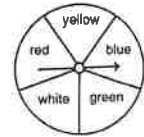
1, 2, 3, 4, 5, 6

flipping a coin

heads  
tails

rolling a 12-sided die

1, 2, 3, 4, 5, 6,  
7, 8, 9, 10, 11, 12



yellow  
blue  
green  
white  
red

2) Make an outcome tree for flipping a coin once, and then flipping it again.



How many outcomes? 4

List the outcomes: HH, HT, TH, TT

Which 2 outcomes make the same event?

HT, TH

3) Identify how many outcomes are possible in the following scenarios.

- A car comes in 3 different styles (hatchback, sedan, coupe) and 15 different colors.

$3 \cdot 15 = 45$  outcomes

- A paint store offers 28 basic colors, each of which can be combined with any 4 textures.

$28 \cdot 4 = 112$  outcomes

- A ski store offers a sale that includes 9 different types of skis, 8 types of bindings, and 12 types of boots.

$9 \cdot 8 \cdot 12 = 864$  outcomes

4) Determine what type of probability is used for each statement.

- Based on recent games, the chance that Paul Goldschmidt will hit a homerun is 35%. empirical

- I am confident that I will receive an A on the final exam. subjective

- The chance of being born on a Friday is 1 out of 7. theoretical

- The chance that I will get into the college of my choice is high. subjective

- We've had snow on Christmas in 27 out of the last 100 years, so the chance of having snow on Christmas is 0.27.

empirical

5) Find the empirical probability of the following scenarios.

- Your local weatherman has given a correct forecast 18 times out of the last 30 days. What is the probability that his forecast for tomorrow is correct?

$\frac{18}{30}$   $\frac{3}{5}$  or 60%

- What is the probability that the weatherman's forecast is NOT CORRECT?

$\frac{2}{5}$  or 40%

- You toss a coin 100 times and land on heads 42 times. Based on these chances, what is the likelihood your next toss will be heads?

$\frac{42}{100}$   $\frac{21}{50}$  or 42%

- A doctor diagnosed 250 patients with pneumonia, and 225 of them actually had pneumonia. What is the likelihood that the next patient who is diagnosed with pneumonia will actually have it?

$\frac{225}{250}$   $\frac{9}{10}$  or 90%

- Data was collected from random people on their hair color and put in the table.  
Based on this table, what is the probability that the next person surveyed will NOT have black hair.  $P(\text{brown, blond, red})$

Type	Frequency
Brown	15
Black	10
Blond	16
Red	2

$$\frac{33}{43} \text{ or } 77\%$$

6) Find the theoretical probability of the following events.

P(rolling a 3)

$$\frac{1}{6}$$

P(rolling less than 3)

$$\frac{2}{6}$$

$$\frac{1}{3}$$

P(NOT rolling greater than 5)  $(1, 2, 3, 4, 5)$

$$1 - P(7, 5)$$

$$1 - \frac{1}{6}$$

$$\frac{5}{6}$$

P(landing on tails)

$$\frac{1}{2}$$

P(drawing a club)

$$\frac{13}{52}$$

$$\frac{1}{4}$$

P(drawing a Queen)

$$\frac{4}{52}$$

$$\frac{1}{13}$$

P(NOT drawing a face card)

$$1 - \frac{12}{52} = \frac{40}{52}$$

$$\frac{10}{13}$$

P(drawing a 4 of hearts)

$$\frac{1}{52}$$

P(drawing a red card)

$$\frac{26}{52}$$

$$\frac{1}{2}$$

P(landing on red)

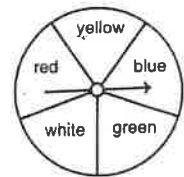
$$\frac{1}{5}$$

P(landing on a primary color)

$$\frac{3}{5}$$

P(NOT landing on white)

$$\frac{4}{5}$$



7) Find the probability for the following "AND" events.

P(landing on red AND then green)

$$\frac{1}{5} \cdot \frac{1}{5} = \frac{1}{25}$$

P(landing on a primary color AND then white)

$$\frac{3}{5} \cdot \frac{1}{5} = \frac{3}{25}$$

P(rolling a 6 AND then an even number)

$$\frac{1}{6} \cdot \frac{1}{2} = \frac{1}{12}$$

P(rolling less than 3 AND then 5)

$$\frac{1}{3} \cdot \frac{2}{6} \cdot \frac{1}{6} = \frac{1}{18}$$

P(drawing a spade AND then a King)

$$\frac{1}{4} \cdot \frac{1}{13} = \frac{1}{52}$$

P(drawing a black card AND then a 5 of hearts)

$$\frac{1}{2} \cdot \frac{1}{52} = \frac{1}{104}$$

A bag has 5 green marbles, 7 yellow marbles, 2 white marbles, and 6 blue marbles.

Find the likelihood of choosing a blue marble, KEEPING it, and then choosing another blue marble.

$$\frac{6}{20} \cdot \frac{5}{19} = \frac{30}{380} = \frac{3}{38}$$

Find the likelihood of choosing a yellow marble, REPLACING it, and then choosing a white marble.

$$\frac{7}{20} \cdot \frac{2}{20} = \frac{14}{400} = \frac{7}{200}$$

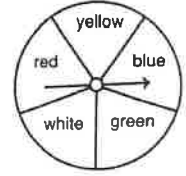
8) Find the probability for the following "OR" events. **Be sure to subtract any overlap!**

P(landing on red OR green)

$$\frac{1}{5} + \frac{1}{5} = \boxed{\frac{2}{5}}$$

P(landing on a primary color OR yellow)

$$\frac{3}{5} + \frac{1}{5} = \boxed{\frac{4}{5}}$$



P(rolling a 6 OR an even number)

$$\frac{1}{6} + \frac{3}{6} - \frac{1}{6} = \boxed{\frac{1}{2}}$$

P(rolling less than 3 OR 5)

$$\frac{2}{6} + \frac{1}{6} = \frac{3}{6} = \boxed{\frac{1}{2}}$$

P(drawing a spade OR a King)

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

P(drawing a black card OR a 5 of hearts)

$$\frac{26}{52} + \frac{1}{52} = \frac{27}{52}$$

The images to the right represent items that can be found in a large recreational bag. Find the following probabilities if you were to pull something at random out of the bag.

P(a ball or something orange)

$$\frac{4}{7} + \frac{2}{7} - \frac{1}{7} = \boxed{\frac{5}{7}}$$

P(a ball or something white)

$$\frac{4}{7} + \frac{2}{7} - \frac{2}{7} = \boxed{\frac{4}{7}}$$



Brown football

Orange basketball



Black water bottle



Orange cone



Black whistle



Black & white soccer ball

White baseball



P(something brown or something black)

$$\frac{1}{7} + \frac{3}{7} = \boxed{\frac{4}{7}}$$

9) Find the following odds or bets based on odds.

Odds FOR rolling a 5

FOR : AGAINST

$$\boxed{1 : 5}$$

$\frac{1}{6}$     $\frac{5}{6}$

Odds AGAINST landing on heads

AGAINST : FOR

$$\boxed{1 : 1}$$

$\frac{1}{2}$     $\frac{1}{2}$

Odds FOR drawing an Ace

FOR : AGAINST

$$\boxed{1 : 12}$$

$\frac{4}{52} = \frac{1}{13}$     $\frac{48}{52} = \frac{12}{13}$

Your horse's odds of winning are 4 to 3. If you bet \$15, how much will you gain if your horse wins?

win \$4 for every \$3 bet

$$\$15 = 5, \$3 \text{ bets}$$

$$5 \times 4 = \$20 + \$15 \text{ bet}$$

$$= \boxed{\$35}$$

Your horse's odds of winning are 5 to 8. If you bet \$40, how much will you gain if you win?

win \$5 for every \$8 bet

$$\$40 = 5, \$8 \text{ bets}$$

$$5 \times 5 = \$25 + \$40 \text{ bet}$$

$$= \boxed{\$65}$$