Section 7.2 - Misrepresenting Data

Sometimes the creator of a graph will intentionally misrepresent the data by incorrectly constructing the graph.

This is usually done to emphasize or draw the reader's attention to an intended interpretation.

The following are some ways in which graphs can be misrepresented...

- starting the scale at a number other than zero.
- using bars of different widths (area)
- absence of a scale
- larger symbols used for a particular category on a pictograph
- no key given for a pictograph symbol
- sections of a pie graph pulled away from the other sectors to emphasize it.

Page 399 # 3-11, 14

Probability

P (E)

P - probability

E - the event

P(E) - the probability of the event

not P(E) - the probability that the event will not occur

Not P(E) is the complement of P(E)

The sum of the probabilities of an event and its complement is always equal to 1.

Example: The probability of getting a 2 when you roll a die is 1 out of 6.
The probability of not getting a 2 is 5 out of 6.

$$\frac{1}{6} + \frac{5}{6} = \frac{6}{6} = 1$$

Theoretical probability- means the probability of events occurring is equally likely

Probability can be expressed as a fraction

We say: the probability of winning if you buy 5 tickets out of 1000 tickets sold is:

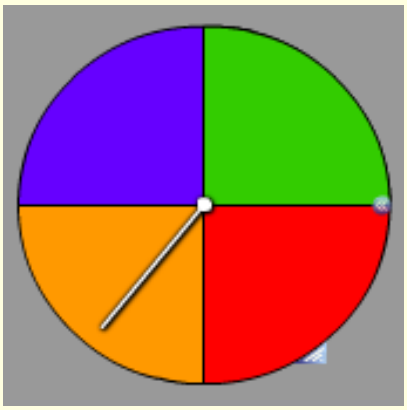
$$= \frac{5}{1000} = \frac{1}{200}$$

P(winning)= $\frac{5}{1000}$ = $\frac{1}{200}$

This means out of 1000 chances of winning you have 5 favorable outcomes.

$$P = \frac{number\ of\ \ favorable\ outcomes}{total\ number\ of\ \ possible\ outcomes}$$

Example: SPINNER



The spinner has 4 possible outcomes. Each outcome is equally likely.

purple $= \frac{1}{4}$ green $= \frac{1}{4}$ orange $= \frac{1}{4}$ red $= \frac{1}{4}$

This does not mean if you spin the spinner 3 times the pointer will land on red or if you spin it 30 times it will land on red 10 times. It does mean if you increase the number of times you spin the spinner the fraction of the times the pointer lands on red will get closer to $\frac{1}{4}$

Experimental Probability

- when an experiment is performed the answer or result is called the outcome.
- the probability of various events occurring is not equally likely.
- conducting an experiment is the only way of determining the probability.

Example: Tossing a paper cup - Lands:

a) upright b) upside down c) sideways

Probability for either is not $\frac{1}{3}$

Example: Thumbtack Toss - Lands:

a) on its head b) side

Probability is not $\frac{1}{2}$

Experimental probability is sometimes called relative frequency. The relative frequency of an outcome is a measure of how often the outcome occurs in an experiment, relative to the total number of outcomes.

$$\text{Relative Frequency} = \frac{\text{number of times outcome occurs}}{\text{total number of outcomes}}$$

Section 7.3 - Probability

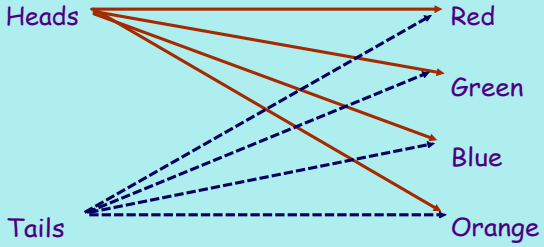
* Events are independent when the result of one event does not affect the result of the other.

Ex. Tossing a coin and Spinning a Spinner

Question: What is the probability of getting a heads and red?

Coin: 2 possible outcomes

Spinner: has 4 possible outcomes



There are 8 possible outcomes:

H R
H B
H G
H O
T R
T B
T G
T O

$$\frac{1}{8} = 0.125 = 12.5\%$$

Rule: P(event 1 and event 2) = P(event 1) X P(event 2)

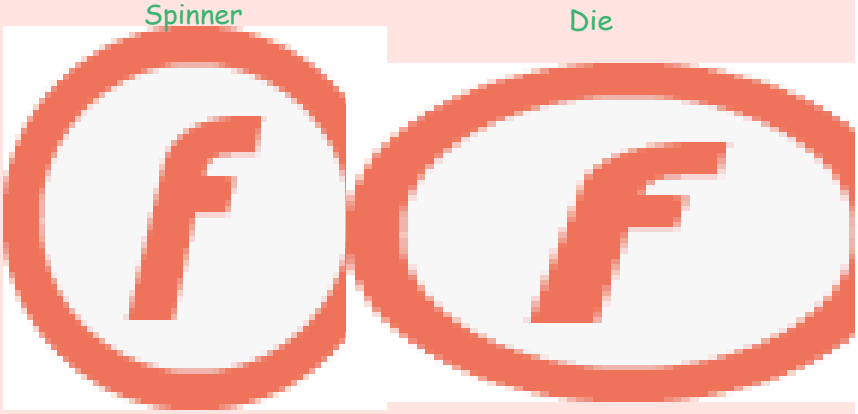
coin toss P(2) spinner P(4)

= 2 X 4
= 8

Example # 2:

Spinner

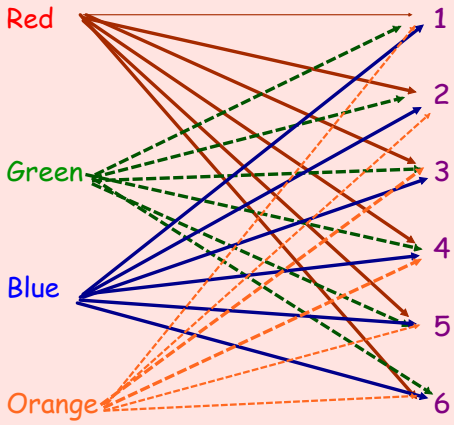
Die



What is the probability of getting a Green and a 6?

Spinner Outcomes: 4

Dice: 6



There are 24 Possible Outcomes

R1	G1	B1	O1
R2	G2	B2	O2
R3	G3	B3	O3
R4	G4	B4	O4
R5	G5	B5	O5
R6	G6	B6	O6

$$P(T) = (P1) \times (P2)$$

$$= 4 \times 6$$

$$= 24$$

$$P(green\ \&\ 6) = \frac{1}{24}$$

Example 3: What is the probability of getting a blue and a number less than 6?

B1
B2
B3
B4
B5

$$\frac{5}{24}$$

What is the probability of getting red and a prime number?

R1
R2
R3
R5

$$\frac{4}{24} = \frac{1}{6}$$

Try these:

1. What is the probability of getting a Green & a 3?

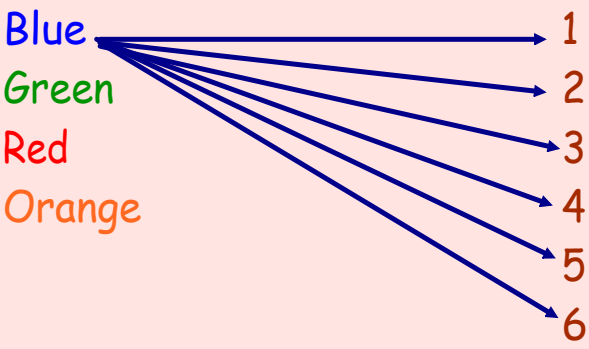
2. What is the probability of getting (odd # and red)?

Example # 3:

Spinner Die Coin

Possible Outcomes

4 colors 6 #'s 2 sides



Heads
Tails

Rule: P(1) x P(2) x P(3)

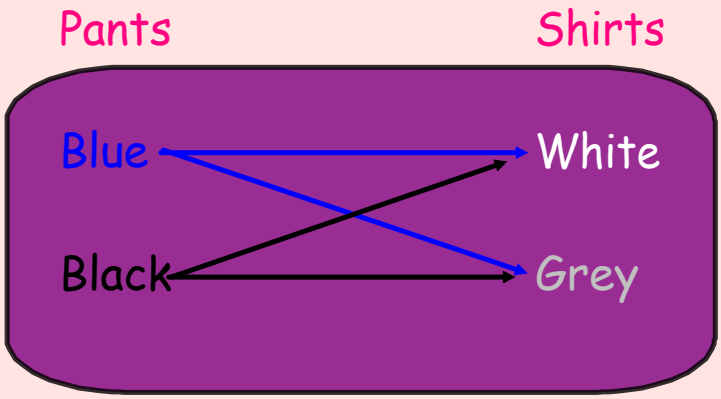
4 x 6 x 2

= 48

What is the probability of getting: red or blue and # less than 6 & heads?

$$2 \times 5 \times 1 = \frac{10}{48} = \frac{5}{24}$$

Example # 5: A school uniform allows the choice to wear blue or black pants and white or grey shirts. What is the probability that a student is wearing blue pants with a white shirt?



BW
BG
BkW
BkG

$\frac{1}{4}$

Example 6: The cafeteria offers chicken burgers, pizza, or nachos as meals and fruit slushies, water or milk.
What is the probability that your friend chooses the following?

(a) P(pizza and milk)

Total Possible Outcomes - $3 \times 3 = 9$

P(pizza & milk) - $1 \times 1 = \frac{1}{9}$

(b) P(chicken burger and water)

(c) P(nachos and not milk)

Example 7: Both you and your friend have a bag of fruit snacks. Each bag has 3 grape, 4 strawberry, 3 orange, and 2 lemon. What is the probability of you picking orange and your friend picking grape?

P(you - orange)

3 grape
4 strawberry
3 orange
2 lemon

P(friend - grape)

3 grape
4 strawberry
3 orange
2 lemon