Probability
10.2

Probability

- Probability is a measure of how likely an event is to occur.

- For example –
  - Today there is a 60% chance of rain.
  - The odds of winning the lottery are a million to one.
  - What are some examples you can think of?

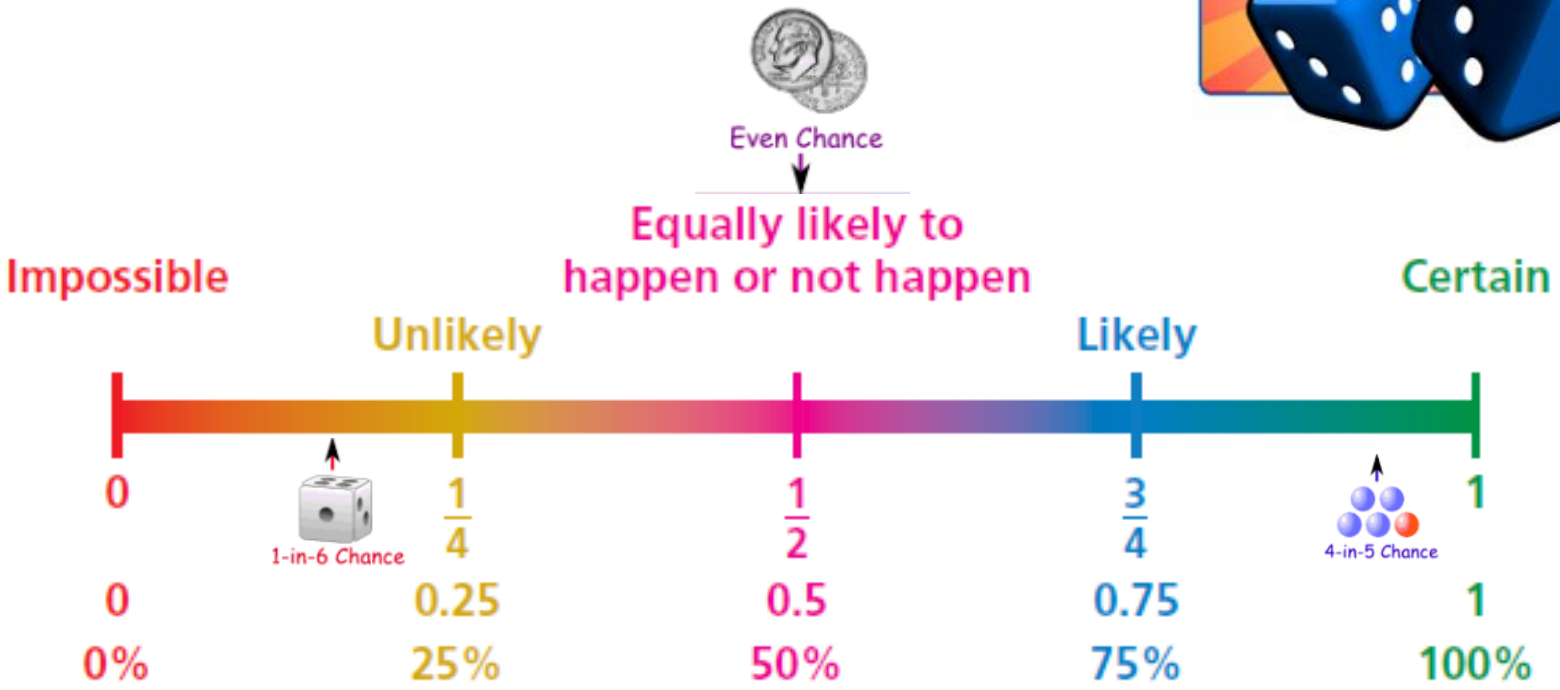
Probability

- Probabilities are written as:
  - Fractions from 0 to 1
  - Decimals from 0 to 1
  - Percents from 0% to 100%

Probability

- If an event is certain to happen, then the probability of the event is 1 or 100%.
- If an event will NEVER happen, then the probability of the event is 0 or 0%.
- If an event is just as likely to happen as to not happen, then the probability of the event is ½, 0.5 or 50%.

Probability Line



Probability

- When a meteorologist states that the chance of rain is 50%, the meteorologist is saying that it is equally likely to rain or not to rain.
- If the chance of rain rises to 80%, it is more likely to rain.
- If the chance drops to 20%, then it may rain, but it probably will not rain.

Probability

- What are some events that will never happen and have a probability of 0%?
- What are some events that are certain to happen and have a probability of 100%?
- What are some events that have equal chances of happening and have a probability of 50%?

Probability

- The probability of an event is written as a ratio:

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

Probability

- You roll the number cube. What is the probability of rolling an odd number?

$$P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

$$P(\text{odd}) = \frac{3}{6}$$ ← There are 3 odd numbers (1, 3, and 5).

← There is a total of 6 numbers.

$$= \frac{1}{2}$$ Simplify.

The probability of rolling an odd number is $\frac{1}{2}$, or 50%.

Using Probability

The probability that you randomly draw a short straw from a group of 40 straws is $\frac{3}{20}$. How many are short straws?

$$P(\text{short}) = \frac{\text{number of short straws}}{\text{total number of straws}}$$

We can write a proportion to solve this problem.

$$\frac{3}{20} = \frac{n}{40}$$ Let n be the number of short straws.

$$20n = 120$$ Use cross products.

$$n = 6$$ Solve for n.

There are 6 short straws.