Probability

What is probability?

Probability is the likelihood of something happening in the **future**.
How is it expressed?

Probability is expressed as a fraction: the denominator is the total number of ways things can occur and the numerator is the number of things that you are hoping will occur:

Probability = $\frac{number of things you are looking for}{total number of things}$

Probability is commonly expressed as a reduced fraction, or as a percentage (for example, $\frac{1}{2}$ = 50%), but it can be expressed in a number of other ways as well. So your local weather forecaster may say:

“There’s a one in four chance of snow this week” 1 in 4 is the same as $\frac{1}{4}$

“This week, we have a 25% chance of snow” Convert $\frac{1}{4}$ to a percent and you get 25%

“Odds are 3 to 1 against snow this week” This means 1 chance of snow and 3 chances of no snow out of 4 chances total

Examples of Simple Probability

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| Question | Answer |
| What is the probability of a flipped coin turning up heads? | $$\frac{1}{2}$$ | because there is 1 head and the coin has 2 sides |
| What is the probability of pulling,at random, the ace of spades out of a deck of 52 cards? | $$\frac{1}{52}$$ | because there is only 1 ace of spades and there are 52 cards in the deck |
| What is the probability of drawing any ace out of a deck of 52 cards? | $\frac{4}{52}$ = $\frac{1}{13}$ | because there are 4 aces in a deck of 52 cards |
| What is the probability of drawing a red marble out of a bag containing 2 red marbles and 5 blue marbles? | $\frac{2}{5+2}$ = $\frac{2}{7}$ | because there are 2 red marbles and 7 marbles in all |

Remember, probability is not dependent on what has happened in the past. A coin has no memory! So if you have tossed a coin and it has come up heads 6 times in a row, the probability of it coming up heads a 7th time is still $\frac{1}{2}$ .