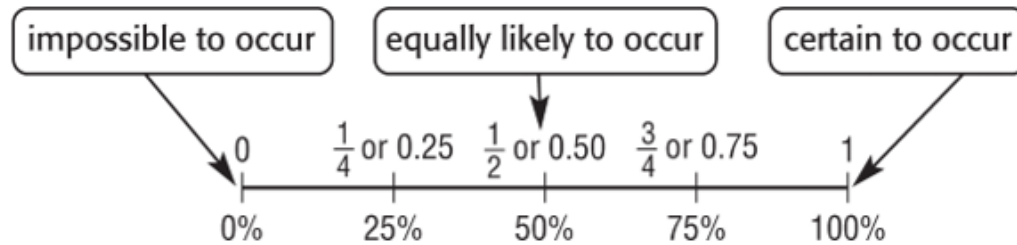


Probability

The Basics

Probability of Simple Events

When tossing a coin, there are two possible **outcomes**, heads and tails. Suppose you are looking for heads. If the coin lands on heads, this would be a favorable outcome. The chance that some event will happen (in this case, getting heads) is called **probability**. You can use a ratio to find probability. The probability of an event is a number from 0 to 1, including 0 and 1. The closer a probability is to 1, the more likely it is to happen.



Examples

- 1. Impossible:** Rolling a normal 6-sided number cube and the number being 38
- 2. Certain:** Some part of you will have touched an object within 5 seconds of reading this.

Finding Probability

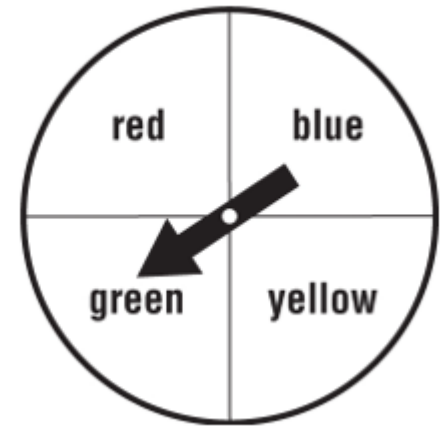
Example 1

There are four equally likely outcomes on the spinner.

Find the probability of spinning green or blue.

$$\begin{aligned} P(\text{green or blue}) &= \frac{\text{number of favorable outcomes}}{\text{number of total outcomes}} \\ &= \frac{2}{4} \text{ or } \frac{1}{2} \end{aligned}$$

The probability of landing on green or blue is $\frac{1}{2}$, 0.50, or 50%.



In other words...

1. To figure out probability you need to first create a fraction.
 - You'll need to find your numerator first (numerator is the TOP number). The numerator is going to be the favorable outcomes. This is what you're looking for the probability of occurring.
 - The denominator (bottom number) is the number of total outcomes. This is all the possible ways an event can occur.

Example: What's the probability of the spinner landing on yellow?

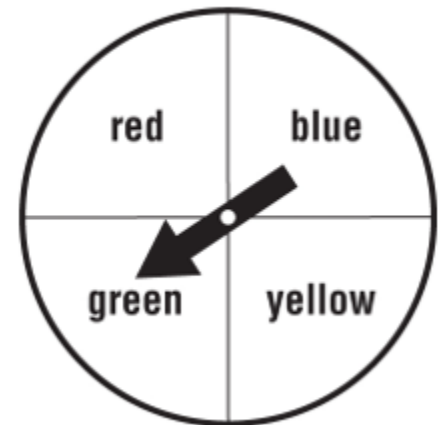
1. Numerator: Favorable Outcomes

- There is 1 way it can land on Yellow.
- Our numerator is 1

2. Denominator: Total Outcomes

- There are 4 possible places for the spinner to land. This means there are 4 possible outcomes
- Our denominator is 4

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



Probability is measured between 0-1

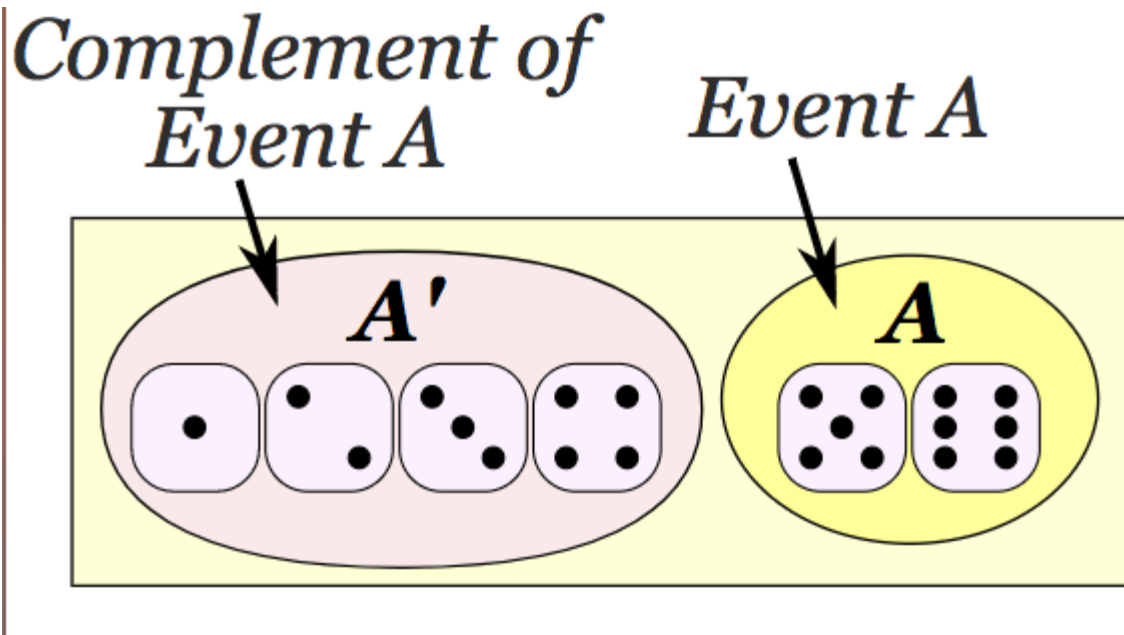
- If probability is measured between 0-1 we need to turn the fraction into a decimal. All you do is divide your fraction to get the decimal.

Going back to the example from the last slide, our fraction was $\frac{1}{4}$ because there's one yellow (favorable) outcome out of four. We divide 1 by 4 and get 0.25.

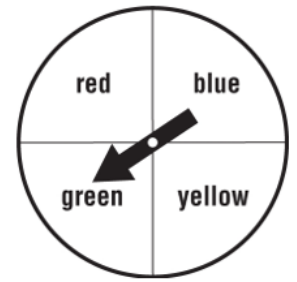
Our Probability would be 0.25.

Complementary Events

Simply speaking, complementary events are the “other” possible outcomes outside of the desired outcome. So if you’re rolling a dice and you want to roll a 5 or 6, the complement would be 1,2,3, and 4.



Complement Example



- Let's go back to spinning a yellow. There was a 0.25 probability ($\frac{1}{4}$).
- The COMPLEMENT would be the spinner landing on either red, blue, or green.
- To find the probability of this occurring all you do is subtract the probability of yellow being chosen from 1.00.

$$1.00 - 0.25 = 0.75$$

The Complement would be 0.75

Why subtract from 1?

1. Remember that 1 as a percent is 100.
2. Any of the events occurring (spinner landing on any color) has 4 favorable outcomes out of 4 possible outcomes $\frac{4}{4}$. You divide that fraction and you get 1.00.