

probability

- It is the opposite of statistics as in statistics we use to analyze data, in probability we predict data using assumptions we make about it.
- $P(A) == 1 - P(\neg A)$ *Not*
- **The best example for understanding probability is flipping a coin:**
 - There are two possible outcomes—heads or tails.
 - What's the probability of the coin landing on Heads? We can find out using the equation $P(H) = ?$ P, left parenthesis, H, right parenthesis, equals, question mark. You might intuitively know that the likelihood is half/half, or 50%. But how do we work that out? Probability =

$$\frac{\text{\# of possibilities that meet by condition}}{\text{\# of equally likely possibilities}}$$

Formula for calculating the probability of certain outcomes for an event.

In this case:

$$P(H) = \frac{1}{2} = 50\%$$

Probability of a coin landing on heads

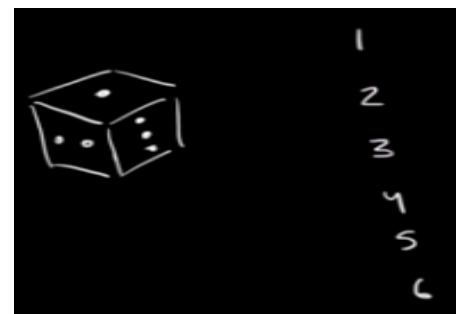
- **Probability of an event = (# of ways it can happen) / (total number of outcomes)**

$$P(A) = (\text{\# of ways A can happen}) / (\text{Total number of outcomes})$$

➤ Example 1

There are six different outcomes.

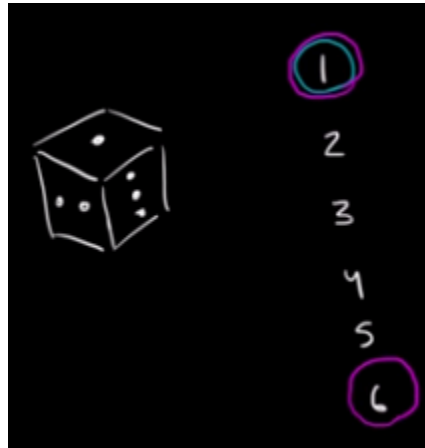
What's the probability of rolling a one?



$$P(1) = \frac{1}{6}$$

#Probability formula for rolling a '1' on a die

What's the probability of rolling a one or a six?



#Probability of a 1 or a 6 outcome when rolling a die

Using the formula from above:

$$P(1 \text{ or } 6) = \frac{2}{6} = \frac{1}{3}$$

#Probability formula applied

What's the probability of rolling an even number (i.e., rolling a two, four or a six)?

- To make it easier to calculate the possible probabilities we can use truth table.