

**Probability-** The likelihood for an event to occur.

The probability will always be in a range from 0 to 1 (0% to 100%)

- 0 (0%) will never happen
- 1 (100%) will always happen

**Experimental Probability-** The probability of an event based on the experiment conducted.

$$P(\text{event}) = \frac{\text{\# of times the event occurs}}{\text{\# of trials}}$$

Ex. A dart player hits the bull's eye on a dart board 8 times out of 50. Find the experimental probability that the player hits the bull's eye.

**Simulation-** When actual trials are difficult to conduct you can find experimental probabilities using a simulation; a model of the event.

Ex. Find a simulation to model taking a 5 question True or False test where you guess on every question.

**Theoretical Probability-** The probability of an event based off of calculations

- Sample Space- the set of all possible outcomes

Ex. Find the sample space for a coin.

Ex. Find the sample space for a dice (# cube)

- If a sample space has  $n$  equally likely outcomes and Event A occurs in  $m$  of the outcomes, then the theoretical probability of A is  $P(A) = \frac{m}{n}$

Ex. Find the theoretical probability of rolling a multiple of 3 with a number cube.

Ex. Fold your hands so your fingers interlace. Do you naturally place your left or right thumb on top? Placing your left thumb on top is a dominant genetic trait. When a parent has both a dominant and a recessive gene then the two genes are equally likely to be passed to a child. If you have one or two dominant genes, you normally place your left thumb on top. Suppose a child has parents who both have just one dominant gene. What is the theoretical probability that the child will naturally place the left thumb on top? What is the theoretical probability that a child of the parent places the right thumb on top?

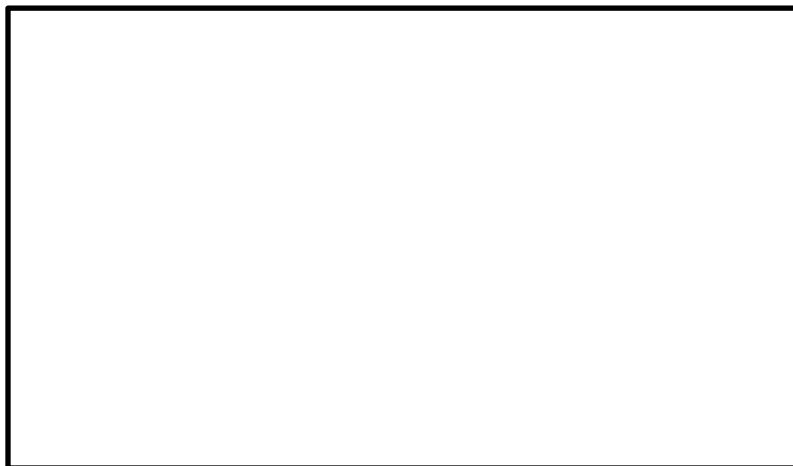

Ex. Brown is a dominant eye color for humans. If a father and mother each carry a gene for brown and a gene for blue, what is the probability of a child of theirs having blue eyes?

B = Brown  
b = blue

BB = Brown  
Bb = Brown  
bb = blue


### Venn Diagrams

Ex. Out of a group of 100 students: 31 drink coffee, 42 drink energy drinks, 16 drink both.



What is the probability that a randomly selected student does not drink coffee or energy drinks?