

SATPREP

A **probability** is a numerical measure of the likelihood of the event. Probability is established on a scale from 0 to 1. A rare even has a probability close to 0; a very common event has a probability close to 1.

In order to solve and understand problems pertaining to probability you must know some vocabulary:

- An **experiment**, such as rolling a die or tossing a coin, is a set of trials designed to study a physical occurrence.
- An **outcome** is any result of a particular experiment. For example, the possible outcomes for flipping a coin are heads or tails.
- A **sample space** is a list of all the possible outcomes of an experiment.
- An **event** is a subset of the sample space. For example, getting heads is an event.

The **probability** of an event, E , is represented by $P(E)$. To calculate the probability of an event, you must find the total number of outcomes $n(S)$, and the favorable number of outcomes, $n(E)$.

The general equation of the probability of an event is:

$$P(E) = \frac{\text{Number of Favorable Outcomes}}{\text{Total Number of Outcomes}}$$

Example

What is the probability of drawing a spade from a pack of 52 well-shuffled playing cards?

Solution

The probability of drawing a spade from a pack of 52 well-shuffled playing cards is; Event (E) = ' a spade drawn ', the number of outcomes corresponding to E = 13 (spades) and the total number of outcomes = 52 (cards)

$$\frac{13}{52} = \frac{1}{4} = 0.25$$

When there is no possibility for an event to occur, the probability of the event happening is 0. For example in a bag of red and blue marbles the probability of picking an orange one is 0. Similarly, when the event is certain to occur, the probability of that event is 1.

Example:

Suppose we have a jar with 4 red marbles and 6 blue marbles, and we want to find the probability of drawing a red marble at random. In this case we know that all outcomes are equally likely: any individual marble has the same chance of being drawn. What's the probability of drawing a red marble?

$$\frac{\text{Number of red marbles}}{\text{Total marbles in Jar}} = \frac{4}{10}$$

Solution

Since 4/10 reduces to 2/5, the probability of drawing a red marble expressed as a decimal is 0.4 ; as a percent, 4/10 = 40%. The probability of picking a blue marble is 6/10, which reduces to 3/5. As a decimal this is 0.6.