

Chapter 10	Counting and Probability
Section 3	Probability

Experiment	A process, such as tossing a coin, rolling a die, drawing a card. The experiment may be defined as repeating the process a fixed number of times.	
Outcome	The results of an experiment.	
Sample Space	The set of all possible outcomes of an experiment.	
Event	A subset of the sample space – the particular outcome we are interested in.	
Probability of an Event	$P(E) = \frac{n(E)}{n(S)}$	where: $n(E)$ is the number of elements in the Event $n(S)$ is the number of elements in the Sample Space

Note that a probability is always a decimal between 0 and 1, inclusive. It can also be written as a percent.

Mutually Exclusive Events	Two events that have no outcome in common.
	Given two events, E and F.
	The probability of either event occurring is the sum of the probabilities of each event.

$$P(E \cup F) = P(E) + P(F)$$

Non-Mutually Exclusive Events	Two events that have an outcome in common.
	Given two events, E and F.
	In the formula above, the common outcome is counted twice. One of those outcomes must be subtracted from the result.

$$P(E \cup F) = P(E) + P(F) - P(E \cap F)$$

Where  $P(E \cap F)$  is the intersection of the two events (the common outcome).

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Independent Events            The occurrence of one event does not affect the other.

Think of it as selection with repetition (with replacement).

$$P(E \cap F) = P(E)P(F)$$

### **Descriptions of Standard Items**

Coin – two sides, one head and one tail

Die – six sides, numbered 1 through 6

Deck of Cards – 52 cards as follows:

13 ranks (1 of each suit): Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, King

4 suits (1 of each rank): Spades, Hearts, Diamonds, Clubs

Jack, Queen and King are FACE cards (they have faces on them)

Spade and Club cards are BLACK

Heart and Diamond cards are RED