1. Basic Probability Definitions

2. You should be familiar with counting methods, such as the General Counting Principle, permutations, and combinations. It is also useful to know the Binomial Theorem. In this lesson, we will define some basic notions for the study of probability.

3. (a) The first idea is that of an **event**. An event is something that may occur in a random process such as flipping a coin, or rolling dice. We will want to assign a probability between 0% and 100% to events, like the probability that the Red River will overflow its banks and flood Moorhead MN this spring.

   (b) We will use the letter 'P' to denote the **probabilty** of the even 'E'. Probability is a function whose input is an event, and whose output is a percent chance.

   (c) The probability of an event cannot be negative, nor can it exceed 1, or 100%

4. It is best when the possible outcomes are listed in away that they are all equally likely. In this case, we merely count the number of outcomes in the event and divide by the total possible outcomes. For example, when flipping two coins, there are four equally likely outcomes, two of which result in one head and one tail.

5. (a) Here is another example. What is the probability of getting a total of 10 when rolling two dice.

   (b) First, we need to count the number of ways to get a total of 10. The three possibilities are listed here.

   (c) We then need to count the total possibilities. By the General Counting Principle, since there are 6 ways that the blue die can land, and six ways the red die can land, then are 6 times $6 = 36$ total possibilities. The probability is therefore 3 out of 36.