We have now arrived at a definition for the probability of an event happening: Among equally likely outcomes, the probability of a desired outcome is

$$\frac{\text{Number of desired outcomes}}{\text{Total number of outcomes}}$$

We also have one method of actually calculating this probability - by listing the sample space.

1. We are going to roll two six-sided (standard) dice. We want to know the probability that the sum of the two numbers we roll is 7. If we wanted to list equally likely outcomes in the sample space, how many outcomes would we have to list?

   Instead, we want to come up with better ways of organizing this data. There are two main types of models, tree and area models.

2. Draw a tree and an area model for the above problem. Which was easier to work with in this case?

3. The tree model requires you to decide on an order for two different things we are doing (rolling the two dice). Suppose that, instead of rolling two 6-sided dice, we roll a 4-sided die (with the numbers 1,2,3,4), and a standard 6-sided die. Compare the two tree models we can make for this situation. Does it make any difference which one we use?

4. Now we are going to roll a number of six-sided dice. We want to know the probability that the sum of the numbers rolled is even. Try drawing tree and area models for rolling 1, 2, 3, or 4 dice. Which models do you prefer, and why? Is there a better option than listing all six possible numbers in your model?