Probability Distributions **Workshop**

1. Make a list of all elements in the sample spaces described below. Then decide if the sample space is equiprobable.

   (a) The possible outcomes when you flip a fair coin three times in a row.

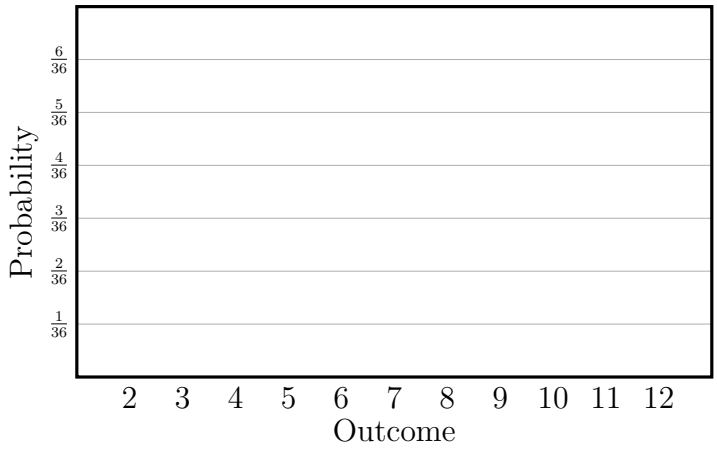
   (b) The possible outcomes when you count the total number of heads after flipping a fair coin three times.

   (c) The result if you roll a six-sided die and flip a fair coin.

2. The table on the left shows the possible totals from rolling two six-sided dice. Use the space to the right to make a probability histogram for the total of 2 dice.

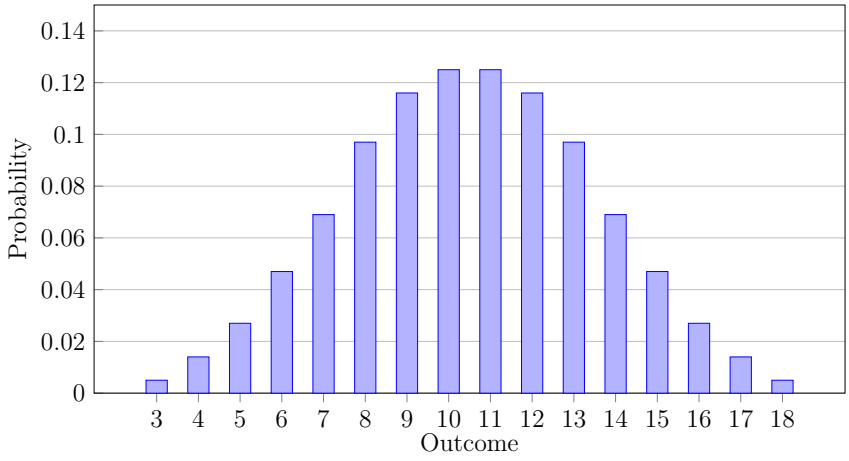
First Die Result

Second Die Result +	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12



3. In the gambling game craps, you roll two six-sided dice and you win if the total is 7 or 11. What is the probability that you win?

Below is the probability histogram for rolling three six-sided dice and adding the results.



4. Let X be the total of the 3 dice. Since we don't know what X will be, it is a **random variable** and the bar graph above is its **probability distribution** since it shows the probability of every possible outcome. To talk about probabilities, we use a shorthand called **probability notation**. Instead of writing a sentence like "The probability that X is even is 0.5.", we write $P(X \text{ is even}) = 0.5$. Use the bar graph above to (roughly) estimate the following.

   (a) $P(X = 10)$.

   (b) $P(X \geq 15)$.