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.



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 is even) = 0.5. Use the bar graph above to (roughly) estimate the following.

(a) P(X = 10).

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