

Part 5.1: Uniform Distributions

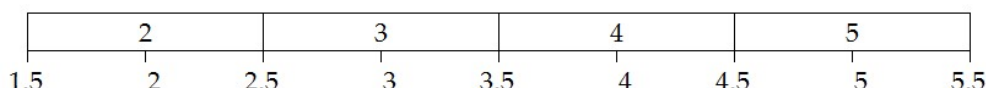
Let's look at an example for the uniform distribution.

Example

The number of people at a business on a given day is known to be between 2 and 5 people. What is the probability that there will be more than 3 people at the business?

Answer

The first thing we need to do is think about the numbers... the smallest number that rounds up to 2 is 1.5 and the largest number that rounds down to 5 is 5.5... if we were to draw a diagram of what this looked like it would look a bit like this:



You can see that 2 goes from 1.5 to 2.5, 3 goes from 2.5 to 3.5 and so on. This means $a = 1.5$ and $b = 5.5$.

Therefore if we want to know the probability there are more than 3 people at the business you need to know from the area of the rectangle from 3.5 (more than 3) to 5.5.

$$\text{Height} = \frac{1}{b-a} = \frac{1}{5.5-1.5} = \frac{1}{4}$$

$$\text{Probability} = \text{base} \times \text{height} = 2 \times \frac{1}{4} = \frac{1}{2}$$

Exercise 5.1

- The number of students in a class is between 25 and 32. What is the probability there are:
 - Less than 28 students in the class?
 - More than 30 students in the class?
 - Exactly 26 students in the class?
- The height of students is measured to the nearest 0.1 m. The tallest student was 2.1 m and the shortest was 1.5 m. Based on this what is the probability a student is measured to be:
 - More than 1.7 m tall?
 - Less than 2 m tall?
 - Measured to be 1.7 m tall?
- The weight of vegetables I buy from the supermarket is between 400 g and 500 g measured to the nearest 5 grams. What is the probability the weight is:
 - More than 450 g?
 - Less than 470 g?
 - 400 g or less?
- The number of pens in my pocket is always less than 10. What is the probability I have:
 - 1 pen in my pocket?
 - More than 5 pens in my pocket?
 - No pens in my pocket?