## Part 3.2: Mean and Standard Deviation

Occasionally we need to find the mean and the standard deviation for a continuous uniform distribution. The formulae for this are not given to you, but are pretty easy to remember. They are:

$$\text{Mean} = \tfrac{1}{2}(a + b) \qquad\qquad\qquad \text{Standard deviation} = \tfrac{1}{\sqrt{12}}(b - a)$$

**Example**
The time taken for a component to wear out has a uniform distribution with a minimum of 5 days and a maximum of 15 days. Calculate the mean and the standard deviation.

**Answer**
$\text{Mean} = \tfrac{1}{2}(a + b) = \tfrac{1}{2}(5 + 15) = 10$   and   $\text{standard deviation} = \tfrac{1}{\sqrt{12}}(b - a) = \tfrac{1}{\sqrt{12}}(15 - 5) = 2.89 \ (3sf)$

## Exercise 3.2

For each of the following, assuming it is uniform, calculate the mean and the standard deviation.

1. The time taken to tie a knot has a uniform distribution. The minimum time is 4 seconds and the maximum time is 8 seconds.
2. The amount of grain that spills from a bag has a uniform distribution with a minimum of 2 g and a maximum of 12 g.
3. The length of pieces of wood have a uniform distribution with a minimum of 3 m and a maximum of 3.2 m.
4. A farmer knows that the heaviest his cows get is 790 kg and the lightest is 660 kg.
5. The amount spend on my phone bill a month has a minimum of $80.00 and a maximum of $93.00.
6. The maximum length of a pen is 12.52 cm and the minimum length is 12.41 cm.
7. The maximum distance a rugby player can normally kick a ball is 49 m and the minimum is 10 m.
8. The minimum time I spend each day reading is 10 minutes and the maximum is 3 hours.