Part 5.3: Normal Distribution

Example
The lengths of piping in a storage shed are normally distributed with a mean of 3 m and a standard deviation of 0.65 m. They are marked with their length rounded to the nearest 0.1 m. What is the probability the piping is labelled as being 2.5 m long?

Answer
This time we leave the mean and the standard deviation alone. The only thing that changes is the values we are looking between. For this question, the smallest number that rounds to 2.5 is 2.45 and the largest number that rounds to 2.5 is 2.55. Therefore we need to find the probability the length is between 2.45 and 2.55. Using either our tables or a calculator we find this is 0.0456.

Exercise 5.3

1. The number of hair ties in a packet is normally distributed with a mean of 15 and a standard deviation of 2. What is the probability there are:
    a. More than 12 hair ties in the packet?
    b. Less than 15 hair ties in the packet?
    c. Exactly 14 hair ties in the packet?
2. The volume of a shampoo bottle is normally distributed with a mean of 383 mL and a standard deviation of 2 mL. If my measuring tools can measure to the nearest 1mL what is the probability there is:
    a. More than 385 mL in the bottle?
    b. Exactly 385 mL in the bottle?
    c. Less than the stated amount of 380 mL in the bottle?
3. The number of cotton buds in a box normally distributed with a mean of 200 and a standard deviation of 30. Calculate the probability the number of cotton buds in the box is:
    a. More than 150.
    b. Less than 290.
    c. Exactly 200.
4. The length of a zips in dresses are normally distributed with a mean of 45 cm and a standard deviation of 10 cm. Zips are only sold in 5 cm increments. What is the probability the zip is:
    a. More than 50 cm long?
    b. Less than 60 cm long?
    c. A 45 cm zip?
    d. A 10 cm zip?