

Part 5.2: Triangular Distribution

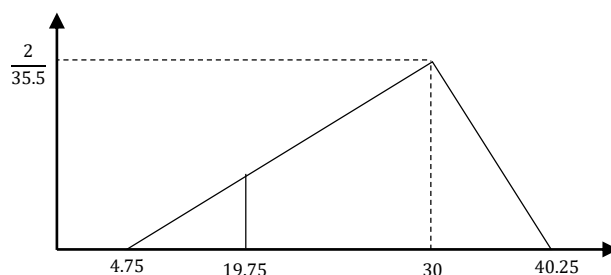
Exactly the same principle applies to the triangular distribution. Let's look at an example...

Example

The amount of petrol in my tank is always between 5 L and 40 L. It normally has approximately 30 L in it. I only know the amount of petrol to the nearest 0.5 L. What is the probability there is less than 20 L in my tank?

Answer

Again, we need to think about the largest number that rounds to 5 L and the smallest number that rounds to 40 L... in this case $a = 4.75$ and $b = 40.25$. Because our modal value is in the middle we don't need to round this, it will still stay as 30. The probability there is less than 20 L in the tank means that the dial would need to display 19.5 L, so any numbers smaller than 19.75 would display this, so $x = 19.75$. If we draw a diagram we get:



Doing the calculations height = $\frac{2(19.75-4.75)}{(40.25-4.75)(30-4.75)} = \frac{240}{7171}$

Probability = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 15 \times \frac{240}{7171} = 0.251$ (3sf)

Exercise 5.2

- The number of biscuits in a jumbo packet is always between 35 and 42, but it is most likely to be 38. What is the probability there are:
 - Less than 37 biscuits?
 - More than 39 biscuits?
 - Between 37 and 39 biscuits inclusive?
 - Exactly 38 biscuits?
- The amount of water in a glass is between 120 mL and 160 mL measured to the nearest mL. Based on looking at it I think there is 130 mL in it. What is the probability there is:
 - More than 150 mL in the glass?
 - Less than 125 mL in the glass?
 - Between 125 mL and 150 mL in the glass?
 - An amount of water that measures to be 125 mL?
- The number of pages in a legal document is known to be between 10 and 20, but is most likely to be 13. Calculate the probability there are:
 - More than 18 pages in the document.
 - Less than 12 pages in the document.
 - Less than 10 pages in the document.
 - Between 13 and 18 pages inclusive.
- The number of pearls on a necklace is somewhere between 45 and 60, the most common number of pearls is 50. What is the probability there are:
 - Less than 50 pearls on the necklace?
 - More than 50 pearls on the necklace?
 - Exactly 50 pearls on the necklace?
 - Between 53 and 55 pearls on the necklace?