

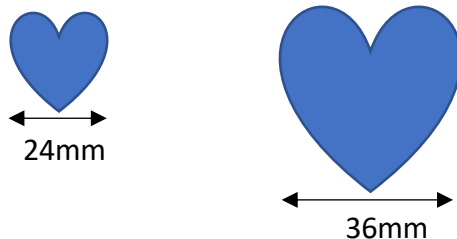
Round all answers to an appropriate degree of accuracy unless specifically stated

1. A function has equation

$$f(x) = x^2 - 8x + 12$$

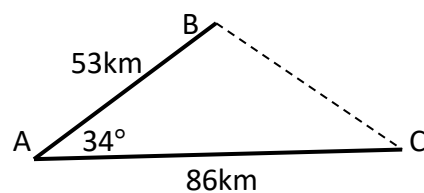
- Find the roots of the function
 - State the coordinates of the y-intercept.
 - Write down the equation of its axis of symmetry.
 - Find the coordinates of the turning point
 - Make a neat sketch of the function, clearly indicating all the points.
2. Identical heart shapes will be used to make a bracelet. An additional larger heart will also be used.

The larger heart is **mathematically similar** to the smaller hearts. Their widths are shown below.



If the area of the small heart is 420mm^2 , work out the area of the larger heart.

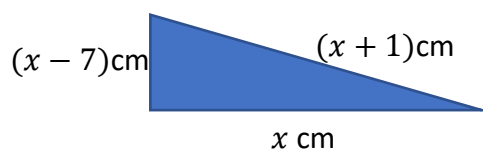
3. Find the equation of the straight line passing through the points $(-1, 3)$ and $(4, 1)$.
4. Two roads both from A are shown below as outlined on a map. Their distances to B and C are also shown.



The authority are planning to build a 3rd road directly from B to C. Calculate the length of this proposed road.

5. A function has equation $f(x) = 16^x$.
Evaluate $f\left(\frac{3}{4}\right)$.

6. The triangle shown below is right angled.



- Show clearly that $x^2 - 16x + 48 = 0$.
- Hence, find the value of x and the lengths of the 3 sides of the triangle.