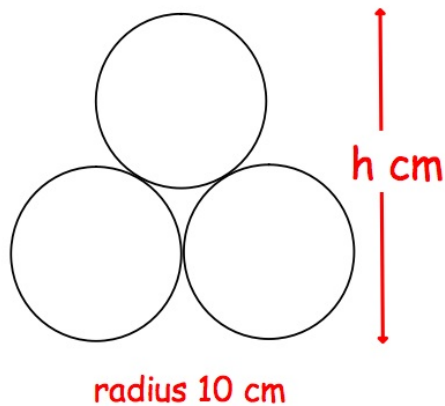
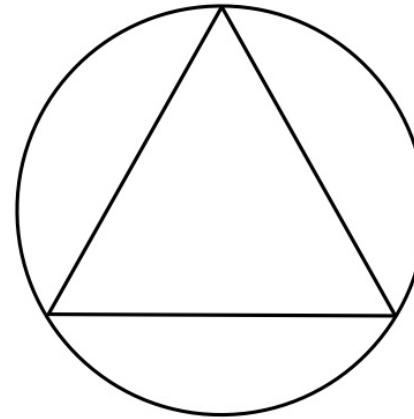


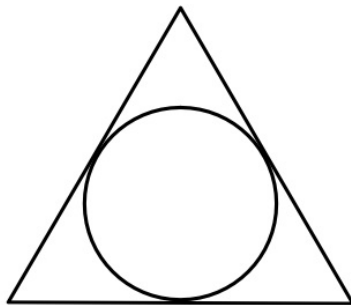
- (1) 3 identical touching circles, radius 10 cm, are shown.
Find the EXACT height h , as a surd in simplest form.



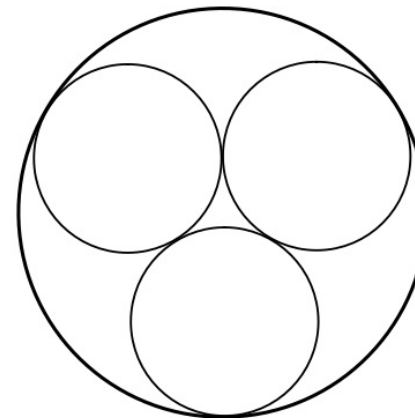
- (2) A circle, radius 10 cm, passes through the vertices of an equilateral triangle as shown.
Find the percentage of the circle occupied by the triangle.



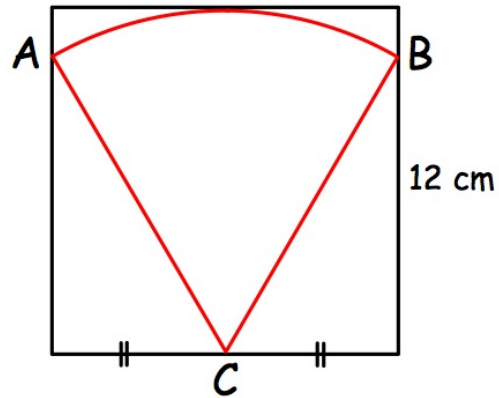
- (3) A circle, radius 10 cm, touches the sides of an equilateral triangle as shown.
Find the EXACT length of the side of the triangle.



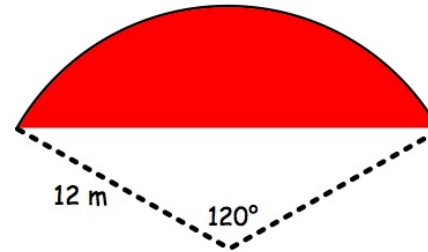
- (4) 3 identical touching circles, radius 10 cm, sit inside a large circle, each just touching its circumference at one point. Find the radius of the large circle.



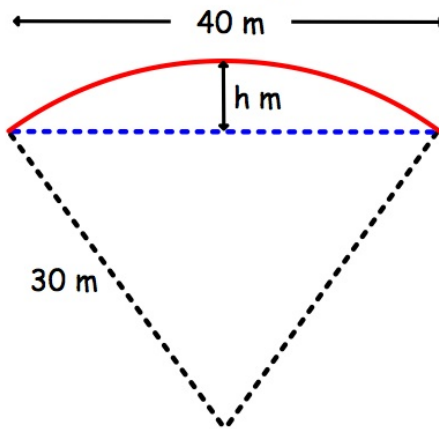
- (5) A sector is inscribed on a 12cm square of paper. Find the EXACT length of arc AB.



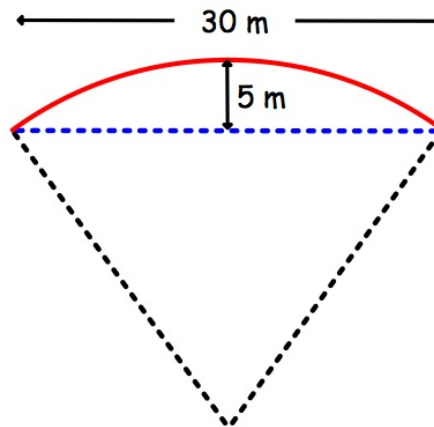
- (6) Find the area of the shaded segment.



- (7) An arched bridge, width 40 m, is formed using the arc of a circle radius 30 m. It rises to a height of h m. Find h .



- (8) An arched bridge is formed using the arc of a circle. It is 30 m wide and rises to a height of 5 m. Find the radius of the circle.



(1) $f(x) = 4^x$

(a) (i) find $f(-1)$ (ii) find $f(3/2)$

(b) (i) if $f(a) = 2$, find a.

(ii) if $f(b) = 1/2$, find b.

(iii) if $f(c) = \sqrt{2}$, find c.

(2) $y(x) = 8^x$

(a) (i) find $y(5/3)$ (ii) find $y(-2/3)$

(b) find $y(1/2)$, as a surd in simplest form.

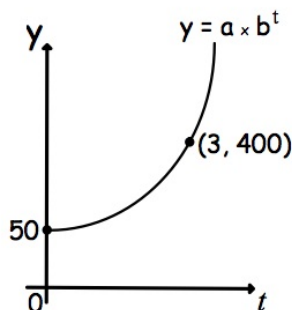
(c) (i) if $y(d) = 1$, find d.

(ii) if $y(e) = 1/2$, find e.

(6) The function is of the form
 $f(t) = a \times b^t$

Find the values of a and b.

$y = a \times b^t$



(3) $h(t) = 2^t$

(a) find $h(5/2)$, as a surd in simplest form.

(b) if $h(m) = \sqrt{2}$, find m.

(c) if $h(p) = 2\sqrt{2}$, find p.

(4) $g(x) = \frac{1}{\sqrt{x}}$ find $g(12)$,

as a surd in simplest form with a rational denominator.

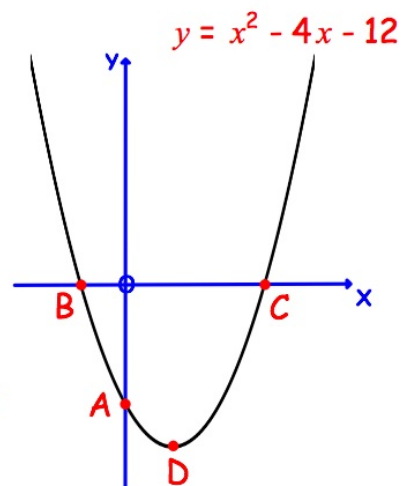
(5) $f(x) = \sqrt{x} - 2\sqrt{2}$

(a) find $f(72)$, as a surd in simplest form.

(b) if $f(n) = \sqrt{2}$, find n.

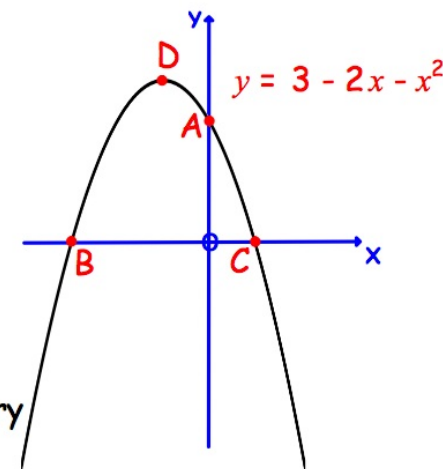
(1) The graph of function
 $f(x) = x^2 - 4x - 12$

- (i) Find the coordinates of points A, B, C and D.
- (ii) State the minimum value of the function
- (iii) State the equation of the axis of symmetry
- (iv) For what values of x is $f(x) < 0$ *ie. $y < 0$.*



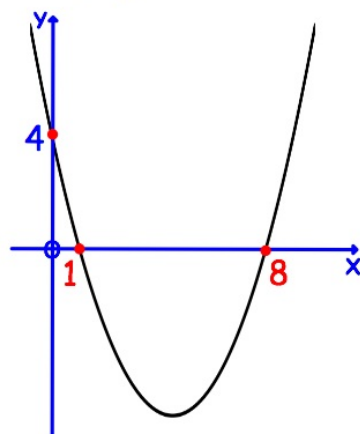
(2) The graph of function
 $f(x) = 3 - 2x - x^2$

- (i) Find the coordinates of points A, B, C and D.
- (ii) State the maximum value of the function
- (iii) State the equation of the axis of symmetry
- (iv) For what values of x is $f(x) \geq 0$ *ie. $y \geq 0$.*



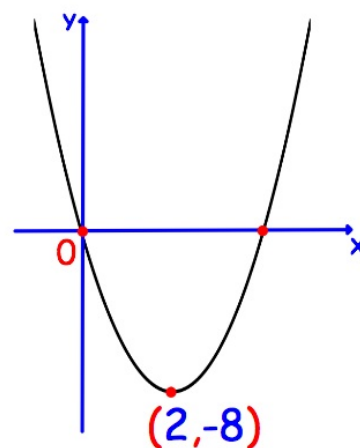
(3) Find the equation of the graph.

The graph is of the form $y = k(x - a)(x - b)$

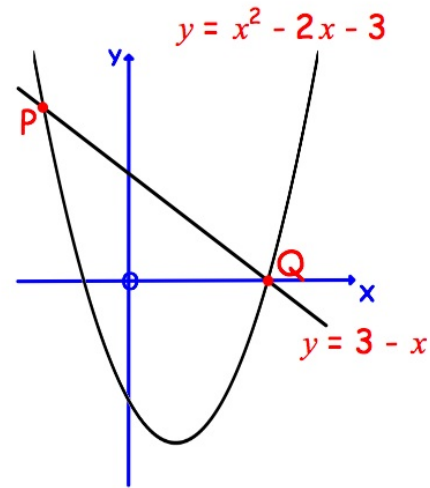


(4) Find the equation of the graph.

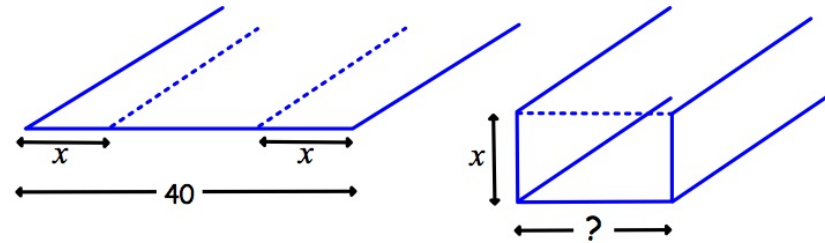
The graph is of the form $y = kx(x - a)$



- (5) Find **algebraically** the coordinates of points P and Q.

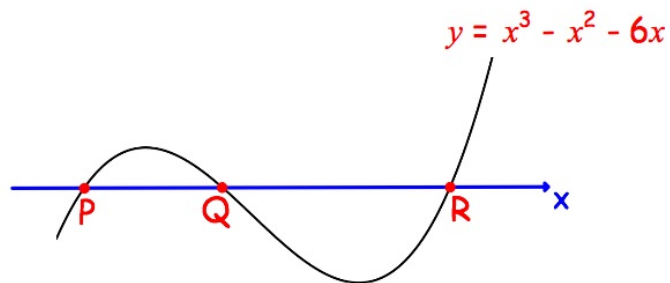


- (6) A rectangular sheet of metal 40cm wide is folded x cm from each end to form a gutter.



- (a) Show the cross-sectional area is $A(x) = 40x - 2x^2$
 (b) Find the value of x which will maximise the water flow.

- (7) (a) Fully factorise $x^3 - x^2 - 6x$
 (b) Hence find the coordinates of points P, Q and R.



- (8) (a) Show that $x^2 - 3x - 18 = 0$
 (b) Hence find x .

