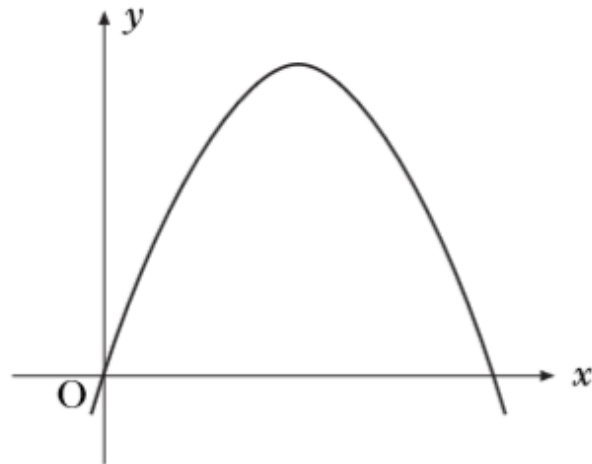


# Quadratic Equations & Graphs of Quadratic Functions

1)

The graph shown below is part of the parabola with equation  $y = 8x - x^2$ .



(a) By factorising  $8x - x^2$ , find the roots of the equation

$$8x - x^2 = 0.$$

2

(b) State the equation of the axis of symmetry of the parabola.

1

(c) Find the coordinates of the turning point.

2

2)

Solve the equation

The roots of

$$ax^2 + bx + c = 0 \text{ are } x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

$$2x^2 - 6x - 5 = 0,$$

giving the roots correct to one decimal place.

4

3)

Maria has been asked to find the roots of the equation

$$x^2 + 3x + 5 = 0.$$

She decides to use the quadratic formula

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}.$$

(a) Calculate the value of  $b^2 - 4ac$ .

1

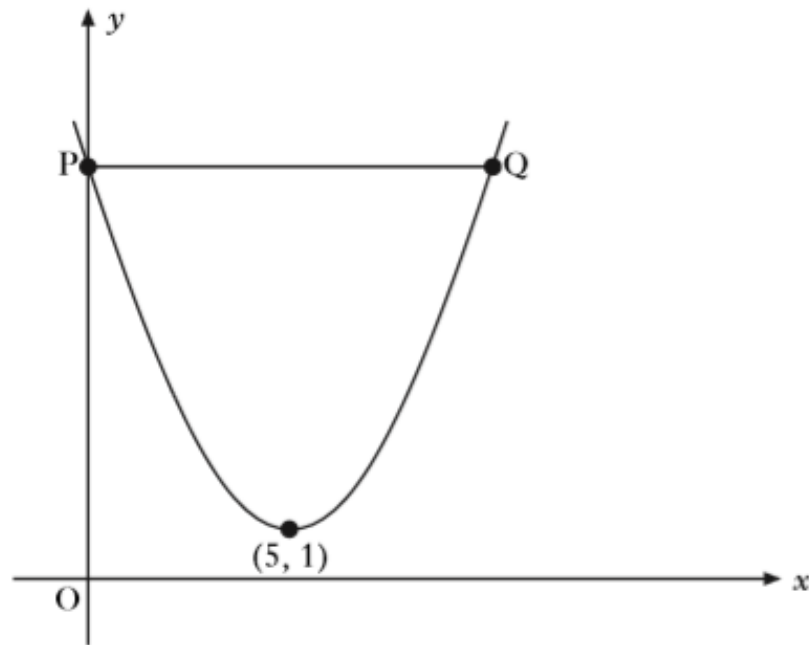
(b) Now explain why Maria cannot find the roots.

1

4)

The graph below shows part of a parabola with equation of the form

$$y = (x + a)^2 + b.$$

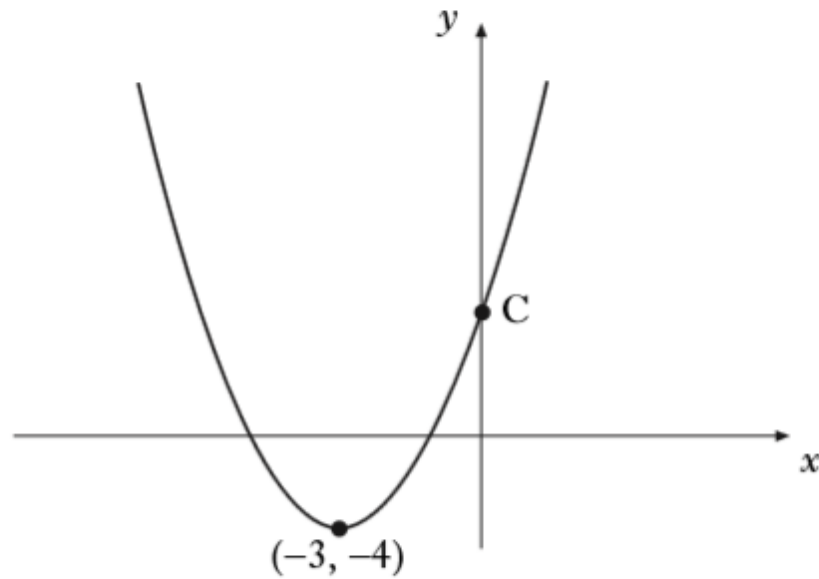


- (a) State the values of  $a$  and  $b$ . 2
- (b) State the equation of the axis of symmetry of the parabola. 1
- (c) The line PQ is parallel to the  $x$ -axis.  
Find the coordinates of points P and Q. 3

5)

The diagram below shows part of a parabola with equation of the form

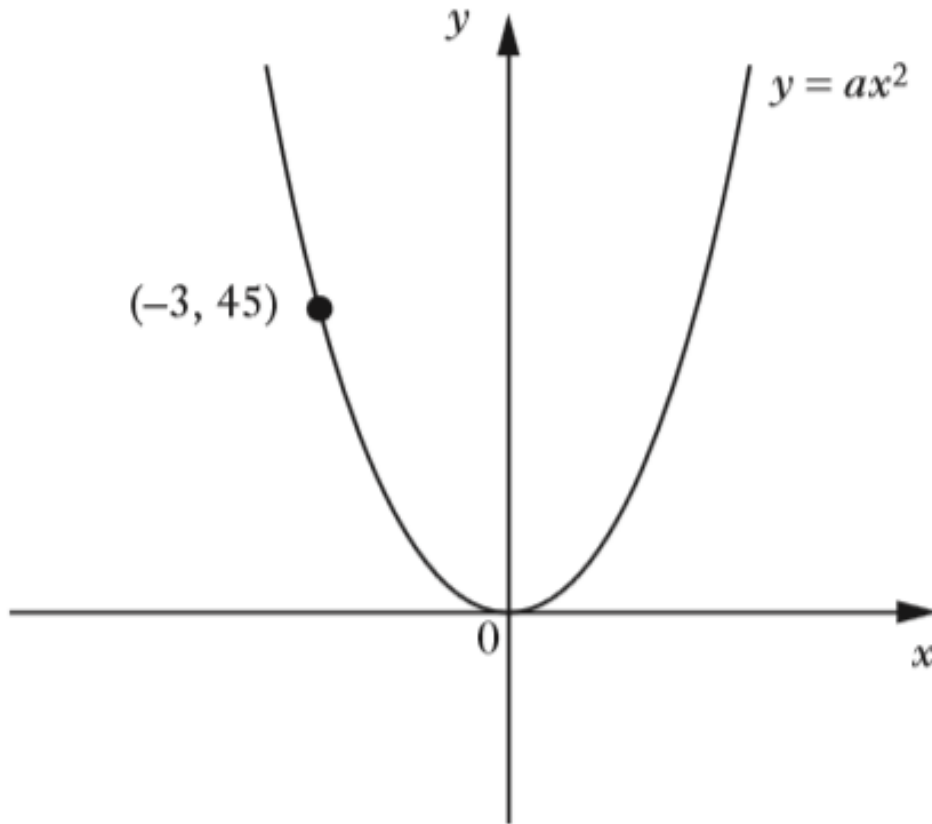
$$y = (x + a)^2 + b.$$



- (a) Write down the equation of the axis of symmetry of the graph. 1
- (b) Write down the equation of the parabola. 2
- (c) Find the coordinates of C. 2

6)

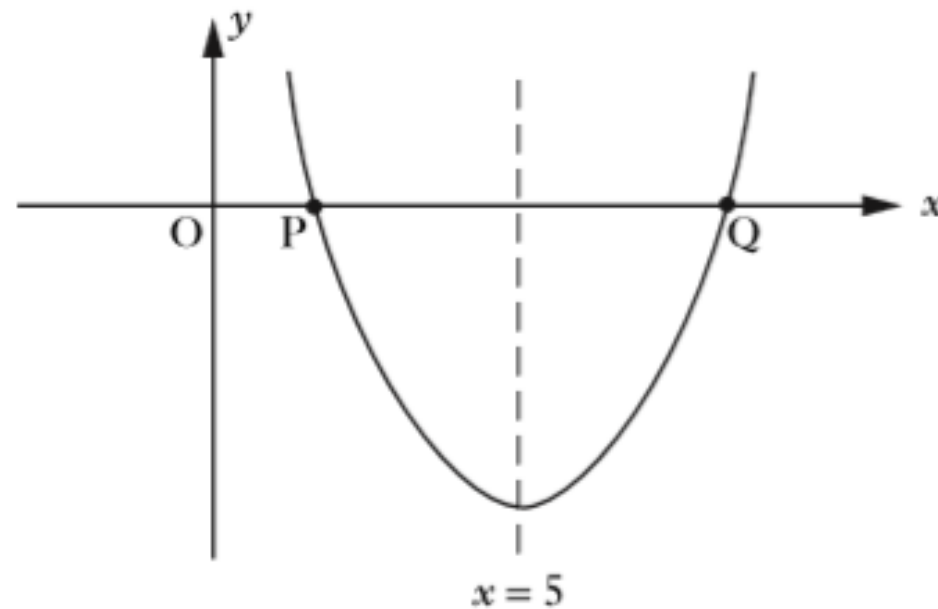
The diagram below shows part of the graph of  $y = ax^2$ .



Find the value of  $a$ .

7)

The graph below shows part of a parabola with equation of the form  $y = (x + a)^2 + b$ .



The equation of the axis of symmetry of the parabola is  $x = 5$ .

- (a) State the value of  $a$ . 1
- (b) P is the point  $(2, 0)$ . State the coordinates of Q. 1
- (c) Calculate the value of  $b$ . 2

8)

A parabola has equation  $y = (x - 2)^2 - 5$ .

(a) Write down the coordinates of the turning point of the parabola.

2

(b) Does this parabola have a maximum or a minimum turning point?

1

9)

Given that

$$x^2 - 10x + 18 = (x - a)^2 + b,$$

find the values of  $a$  and  $b$ .

3

10)

Given that

$$f(x) = x^2 + 3,$$

(a) evaluate  $f(-4)$

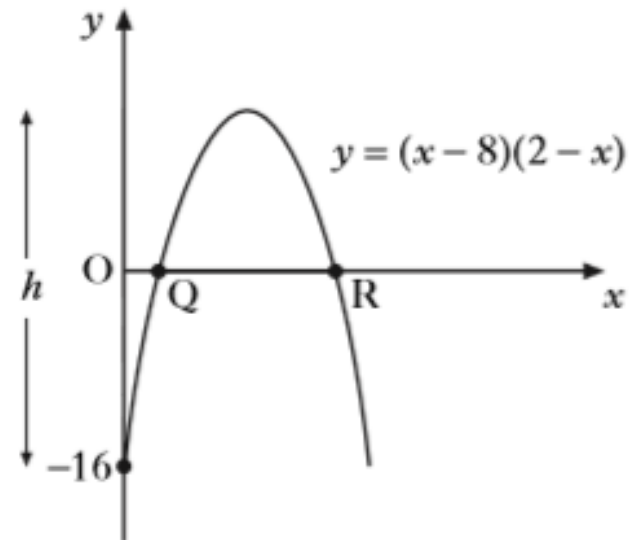
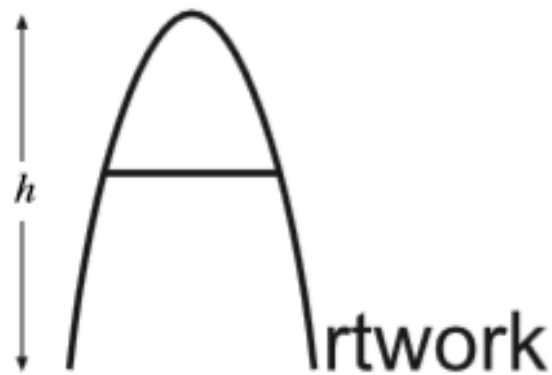
2

(b) find  $t$  when  $f(t) = 52$ .

2

11) The curved part of the letter A in the *Artwork* logo is in the shape of a parabola.

The equation of this parabola is  $y = (x - 8)(2 - x)$ .



- (a) Write down the coordinates of Q and R.
- (b) Calculate the height,  $h$ , of the letter A.

2

3