

2 Find the y -intercepts of the following parabolas.

a $y = x^2 - 6x + 5$

b $y = 2x^2 - 8$

c $y = (x - 2)(x + 3)$

3 Find the x -intercepts of the following parabolas.

a $y = x^2 - 2x - 8$

b $y = 3x^2 + 10x - 8$

c $y = (x - 3)(4x + 7)$

4 Find the equation of the axis of symmetry and the coordinates of the vertex of the following parabolas.

a $y = (x - 3)(x - 5)$

b $y = 3(x - 2)(x + 6)$

c $y = -\frac{1}{2}(x + 4)(2 - x)$

d $y = x^2 - 6x + 7$

e $y = 3x^2 - 9x + 14$

f $y = 4 - 3x - x^2$

5 Find the minimum value of y on the following parabolas.

a $y = x^2 - 6x - 2$

b $y = 4x^2 - 4x + 6$

c $y = 9x^2 - 30x + 18$

6 Find the maximum value of y on the following parabolas.

a $y = 1 - 2x - x^2$

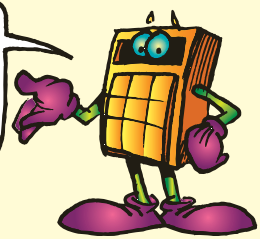
b $y = -4x^2 + 20x - 27$

c $y = 7 - 12x - 9x^2$

7 For the parabola $y = x^2 + 2x - 8$, find:

- a** the y -intercept
- b** the x -intercepts
- c** the axis of symmetry
- d** the vertex
- e** hence, sketch its graph

When finding the x -intercepts, if you can't factorise, then use the formula.



8 Repeat the steps in question 7 to graph the following equations, showing all the relevant features.

a $y = x^2 - 6x + 5$

b $y = x^2 - 6x$

c $y = 2x^2 - 8x - 10$

d $y = -x^2 + 4x - 3$

e $y = -x^2 + 6x - 9$

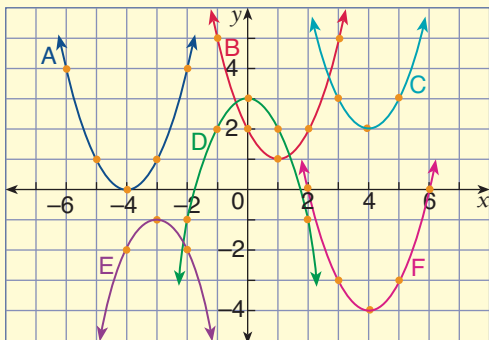
f $y = 2x^2 + 4x + 2$

g $y = x^2 - 3x - 4$

h $y = 2x^2 - 3x - 2$

i $y = -2x^2 - 3x - 1$

9 Match each graph with one of the equations written below the diagram. Each graph has an x^2 shape.



a $y = -x^2 + 3$

b $y = x^2 - 2x + 2$

c $y = x^2 - 8x + 12$

d $y = x^2 + 8x + 16$

e $y = -x^2 - 6x - 10$

f $y = x^2 - 8x + 18$

- 1 Find the turning point.
- 2 Is it happy \uparrow (a is +ve) or sad \downarrow (a is -ve)?
- 3 Visualise the graph before you sketch.



5:02 | The Parabola $y = ax^2 + bx + c$

Name: _____ Class: _____

Examples

For each parabola, find the:

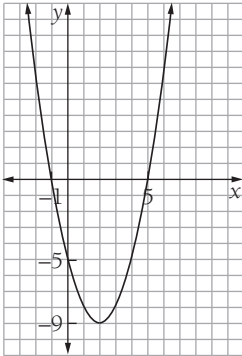
i y-intercept

iii equation of the axis of symmetry

ii x-intercepts

iv coordinates of the vertex.

a



i $y = -5$

ii $x = -1, 5$

iii $x = 2$

iv $(2, -9)$

b $y = x^2 - 8x + 12$

i When $x = 0, y = 12$

\therefore y-intercept = 12

ii When $y = 0, x^2 - 8x + 12 = 0$

$$(x - 2)(x - 6) = 0$$

$$x = 2, 6$$

iii Axis is halfway between x-intercepts,

$$\text{i.e. } x = \frac{2 + 6}{2} = 4$$

iv For vertex, $x = 4, y = 4^2 - 8(4) + 12 = -4$

\therefore Vertex = $(4, -4)$

Exercise

1 For each graph, find the:

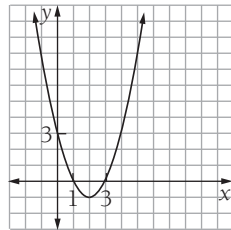
i y-intercept

iii equation of the axis of symmetry

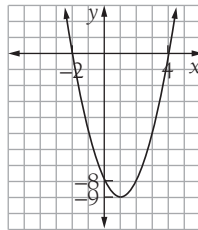
ii x-intercepts

iv coordinates of the vertex.

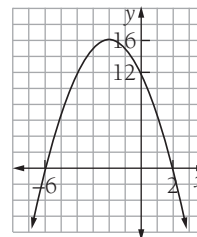
a



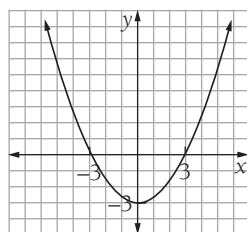
b



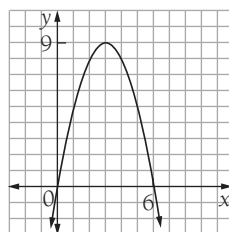
c



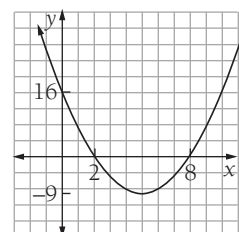
d



e



f



2 For each of these parabolas, find the:

i y-intercept

iii equation of the axis of symmetry

ii x-intercepts

iv coordinates of the vertex.

a $y = x^2 + x - 2$

b $y = x^2 - 8x$

c $y = x^2 + 2x - 8$

d $y = 24 - 2x - x^2$

e $y = x^2 - 8x + 15$

f $y = 4x + x^2$