

EXERCISE 21G

1 Determine the equation of the line of symmetry of:

a $y = x^2 + 4x + 1$

b $y = 2x^2 - 6x + 3$

c $y = 3x^2 + 4x - 1$

d $y = -x^2 - 4x + 5$

e $y = -2x^2 + 5x + 1$

f $y = \frac{1}{2}x^2 - 10x + 2$

g $y = \frac{1}{3}x^2 + 4x$

h $y = 100x - 4x^2$

i $y = -\frac{1}{10}x^2 + 30x$

2 Find the turning point or vertex for the following quadratic functions:

a $y = x^2 - 4x + 2$

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

c $y = 2x^2 + 4$

d $y = -3x^2 + 1$

e $y = 2x^2 + 8x - 7$

f $y = -x^2 - 4x - 9$

g $y = 2x^2 + 6x - 1$

h $y = 2x^2 - 10x + 3$

i $y = -\frac{1}{2}x^2 + x - 5$

3 For each of the following quadratic functions find:

i the axes intercepts**ii** the equation of the line of symmetry**iii** the coordinates of the vertex**iv** and hence sketch the graph.

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

b $y = x^2 + 3x$

c $y = 4x - x^2$

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

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

f $y = -x^2 + 2x - 1$

g $y = -x^2 - 6x - 8$

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

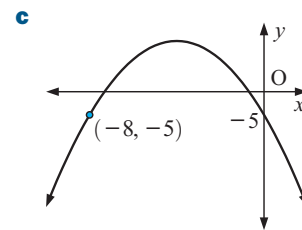
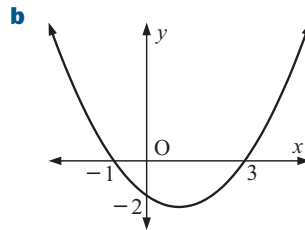
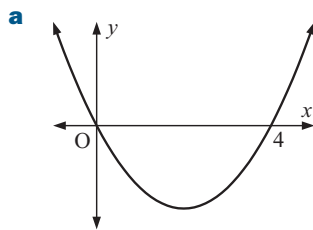
i $y = 2x^2 + 5x - 3$

j $y = 2x^2 - 5x - 12$

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

l $y = -\frac{1}{4}x^2 + 5x$

4 For each of the following, find the equation of the line of symmetry:



5 For each of the following quadratic functions:

i sketch the graph using axes intercepts and *hence* find**ii** the equation of the line of symmetry**iii** the coordinates of the vertex.

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

b $y = x(x - 2)$

c $y = 2(x - 2)^2$

d $y = -(x - 1)(x + 3)$

e $y = -2(x - 1)^2$

f $y = -5(x + 2)(x - 2)$

g $y = 2(x + 1)(x + 4)$

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

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

6 For each of the following:

i sketch the parabola**ii** find the equation of the line of symmetry.

a x -intercepts 2 and -1 , y -intercept -3

b x -intercepts 3 and -3 , y -intercept 6

c x -intercept -2 (touching), y -intercept 4

d x -intercept 2 (touching), y -intercept -6

7 Find all x -intercepts of the quadratic function which:

a cuts the x -axis at 1, and has line of symmetry $x = 2$

b cuts the x -axis at -1 , and has line of symmetry $x = -1\frac{1}{2}$

c touches the x -axis at 2.

