Name: April 21 Date: _____

Practise: Functions of the Form $y = (x - h)^2$

Section 8.4

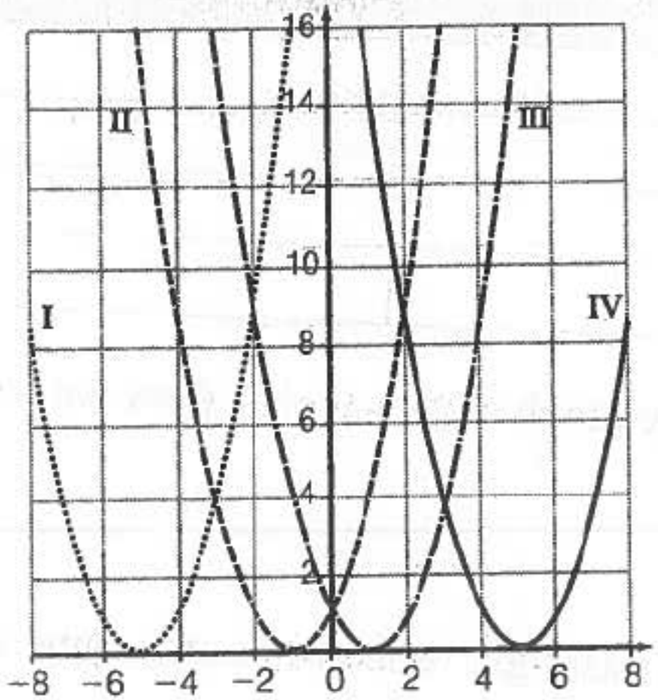
1. Indicate the curve that corresponds to each quadratic function.

a) $y = (x + 5)^2$ I

b) $y = (x - 5)^2$ IV

c) $y = (x - 1)^2$ III

d) $y = (x + 1)^2$ II



Hint
For a horizontal translation, the slide is opposite to the sign in the bracket.

2. For the graph of $y = (x - 8)^2$,

a) give the co-ordinates of the vertex (8, 0)

b) find the x-intercept 8

c) describe the direction of opening up

d) describe its shape relative to the graph of $y = x^2$

same size

3. Place a check mark in each row to complete this table comparing the graphs of $y = x^2 + 9$ and $y = (x + 9)^2$.

vertex (−9, 0)

Feature	Same	Different
Direction of opening	✓	
Vertex		✓
x-intercept		✓
y-intercept		✓
Shape relative to $y = x^2$	✓	

→ to find the x-intercept
y = 0

$y = x^2 + 9$
$y = (x - 0)^2 + 9$
vertex (0, 9)

continued ....

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Section 8.4

4. a) Complete this table.

Equation	Vertex	y-intercept	x-intercepts
$y = (x + 9)^2$	$(-9, 0)$	81	-9
$y = (x - 9)^2$	$(9, 0)$	81	$+9$
$y = x^2 - 9$	$(0, -9)$	-9	3
$y = x^2 + 9$	$(0, 9)$	9	

$y=(x-0)^2-0$ ←

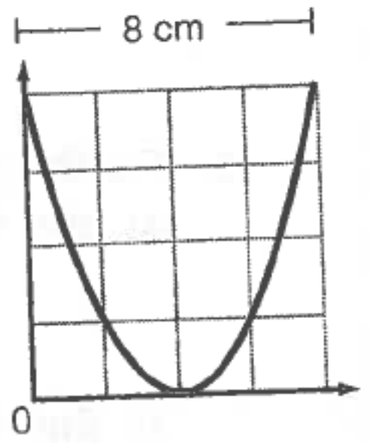
b) Explain why the graph of $y = x^2 + 9$ does not have any x-intercepts.

$0 = x^2 + 9 - 9$

$-9 = \sqrt{x^2}$

negative squared roots don't exist

5. This drawing of a flashlight reflector has the same shape as the graph of $y = x^2$.



a) Find the co-ordinates of the vertex of the reflector.

b) Write the equation for the parabola in the drawing.

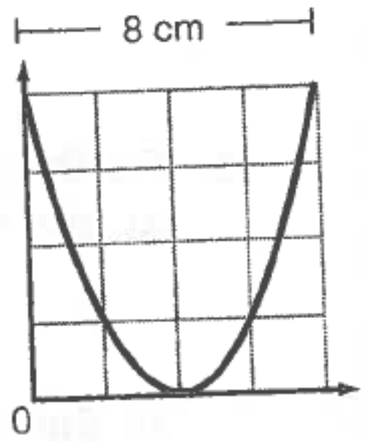
6. Write a quadratic function whose graph is a translation

a) 14 units to the left of the graph of $y = x^2$

b) 10 units to the right of the graph of $y = (x + 1)^2$

Hint
Picture where the vertex of the original graph is, then slide it the required distance.

5. This drawing of a flashlight reflector has the same shape as the graph of $y = x^2$.



a) Find the co-ordinates of the vertex of the reflector.

(4, 0)

b) Write the equation for the parabola in the drawing.

$y = (x-4)^2 + 0$

6. Write a quadratic function whose graph is a translation

a) 14 units to the left of the graph of $y = x^2$

$y = (x+14)^2$

b) 10 units to the right of the graph of $y = (x + 1)^2$ −10

$y = (x-9)^2$

Hint
Picture where the vertex of the original graph is, then slide it the required distance.

7. Draw a line from each description to the corresponding equation.

a) the graph of $y = x^2$ translated down 4 units

$y = x^2 - 4$

b) the graph of $y = x^2$ stretched vertically by a factor of 4

$y = 4x^2$

c) the graph of $y = x^2$ translated right 4 units

$y = (x-4)^2$

d) the graph of $y = (x + 4)^2$ translated right 4 units. −4 $y = x^2$

$y = (x + 4)^2$
$y = (x - 4)^2$
$y = (x + 8)^2$
$y = x^2 + 4$
$y = x^2 - 4$
$y = x^2$
$y = 4x^2$

Name: _____ Date: _____

Practise: Functions of the Form $y = a(x - h)^2 + k$

Section 8.5

1. Complete this table listing how the values of a, h, and k make the graph of the quadratic function $y = a(x - h)^2 + k$ different from the graph of $y = x^2$.

Transformation	Controlled by a, h, or k?
Translation up	k
Vertical compression	a
Translation right	h
Translation left	h
Vertical stretch	a
Translation down	k
Reflection in the x-axis	negative a after equal (frown)

2. Complete this table.

Equation	Vertex	Direction of Opening	Shape Relative to Graph of $y = x^2$
$y = -5(x + 7)^2 - 8$	$(-7, -8)$	down	narrower
$y = 0.75(x - 4)^2 + 2$			
$y = (x + 12)^2 + 9$			
$y = -\frac{5}{8}(x - \frac{7}{9})^2$			
$y = 3x^2 - 5$			

Reflection in the x-axis

2. Complete this table.

Equation	Vertex	Direction of Opening	Shape Relative to Graph of $y = x^2$
$y = -5(x + 7)^2 - 8$	$(-7, -8)$	down	narrower
$y = 0.75(x - 4)^2 + 2$	(4, 2)	up	wider $0 < a < 1$
$y = (x + 12)^2 + 9$	(−12, 9)	up	the same
$y = -\frac{5}{8}(x - \frac{7}{9})^2$	$(\frac{7}{9}, 0)$	down	wider
$y = 3x^2 - 5$	(0, −5)	up	3 times slimmer
$y = -(x - 8)^2 - 2$	(8, −2)	down	same

$y = 3(x-0)^2 - 5$

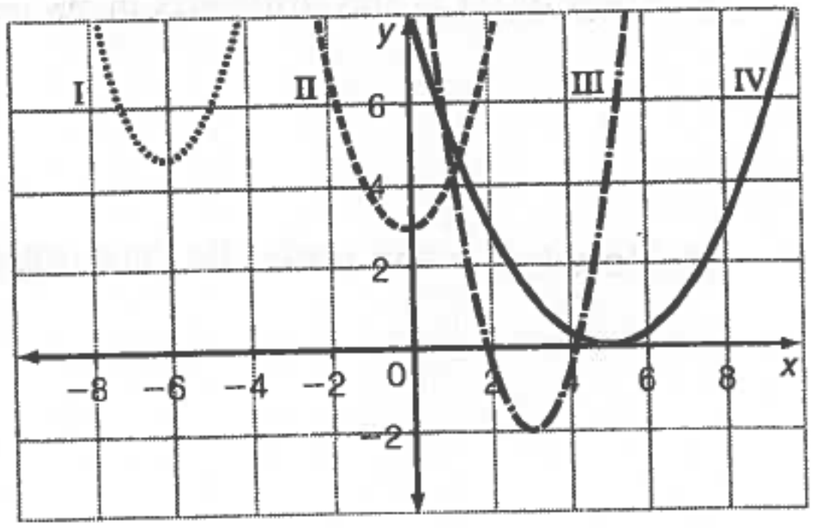
3. Indicate the curve that corresponds to each quadratic function.

a) $y = \frac{1}{3}x^2$ ____ no there (0, 0)

b) $y = x^2 + 3$ II (0, 3)

c) $y = 2(x - 3)^2 - 2$ III (3, −2)

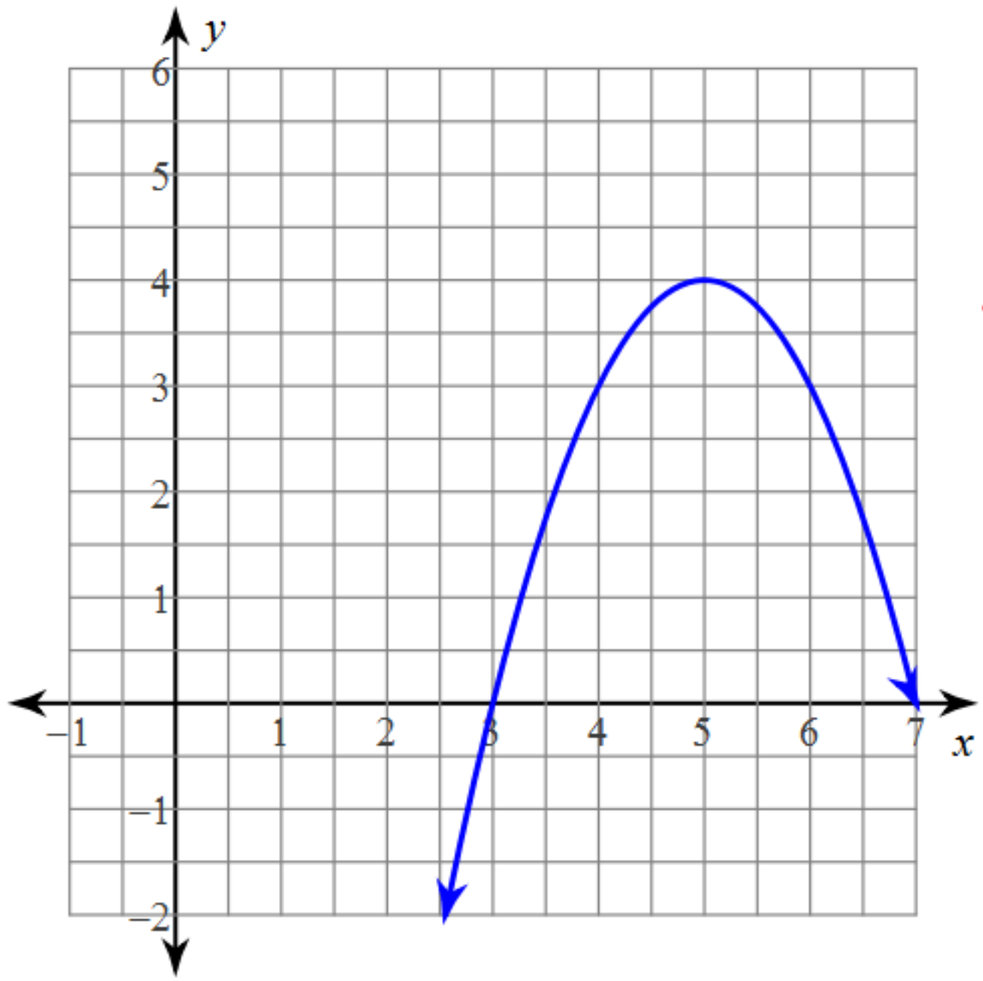
d) $y = (x + 6)^2 + 5$ I (−6, 5)



continued ....

Use the information provided to write the vertex form equation of each parabola.

1)



$y = a(x-h)^2 + k$

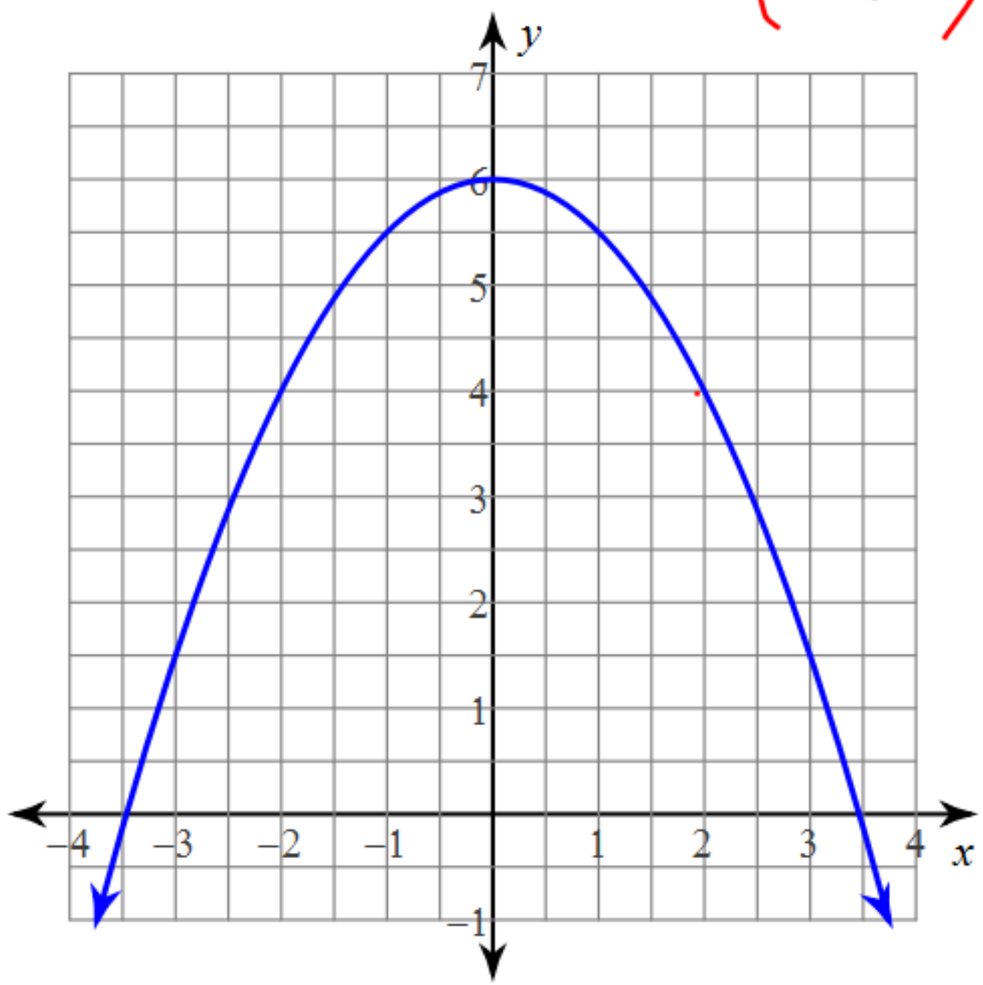
$y = -\frac{1}{\quad}(x-5)^2 + 4$

Vertex

Use the information provided to write the vertex form equation of each parabola.

2)

vertex = (0, 6)



$y = a(x-h)^2 + k$

$y = -\frac{1}{2}(x-0)^2 + 6$

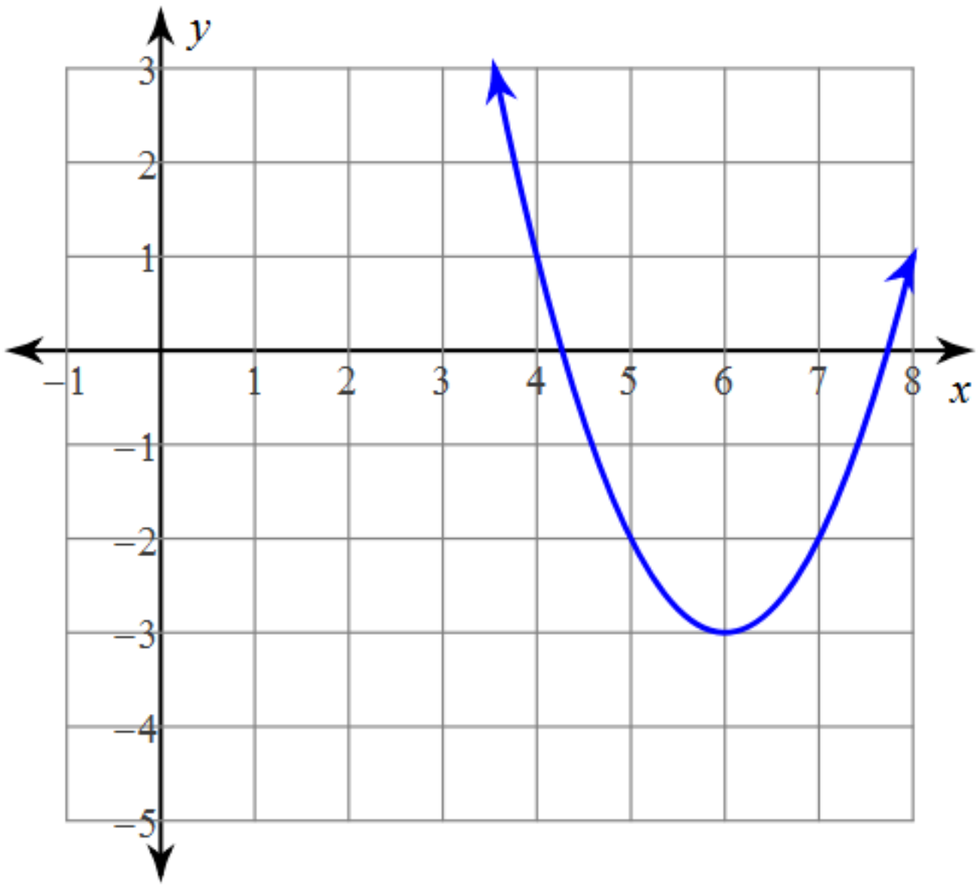
$y = -\frac{1}{2}(x)^2 + 6$

Use the information provided to write the vertex form equation of each parabola.

3)

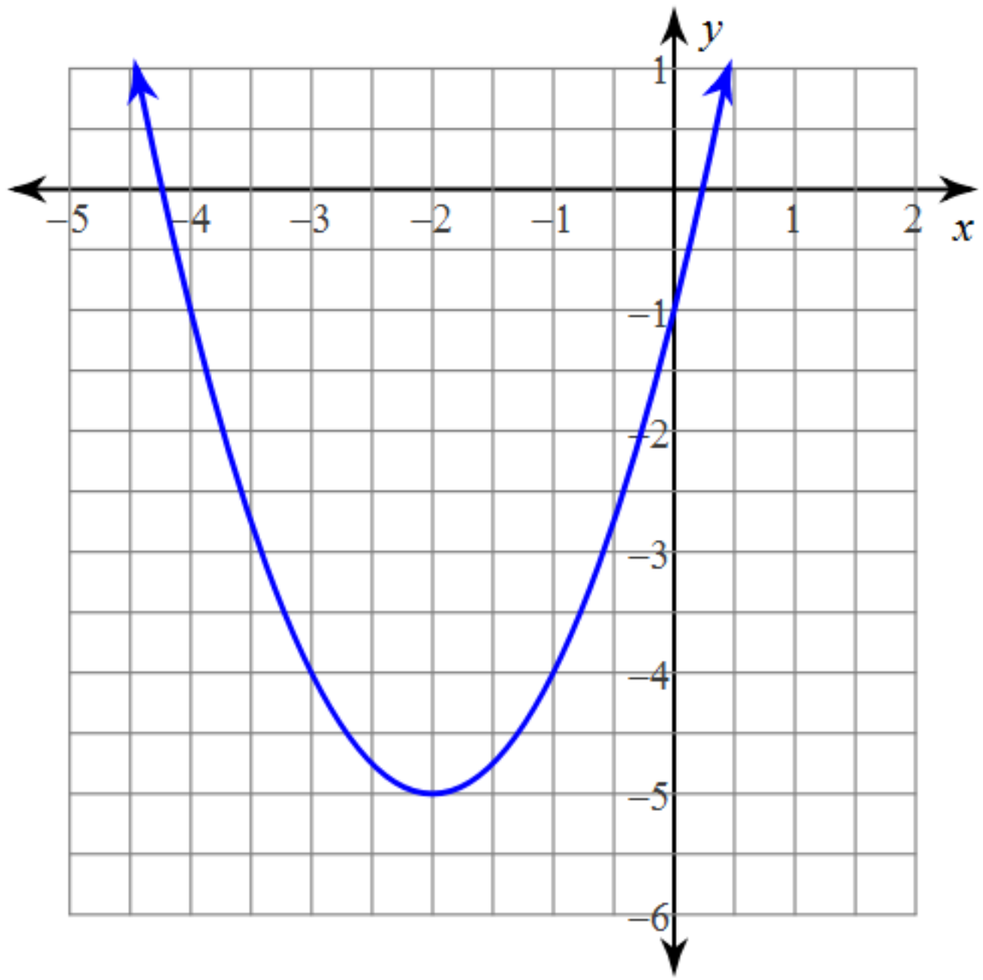
vertex = (6, −3)

$y = 1(x-6)^2 - 3$



Use the information provided to write the vertex form equation of each parabola.

4) vertex $(-2, -5)$



$y = a(x-h)^2 + k$

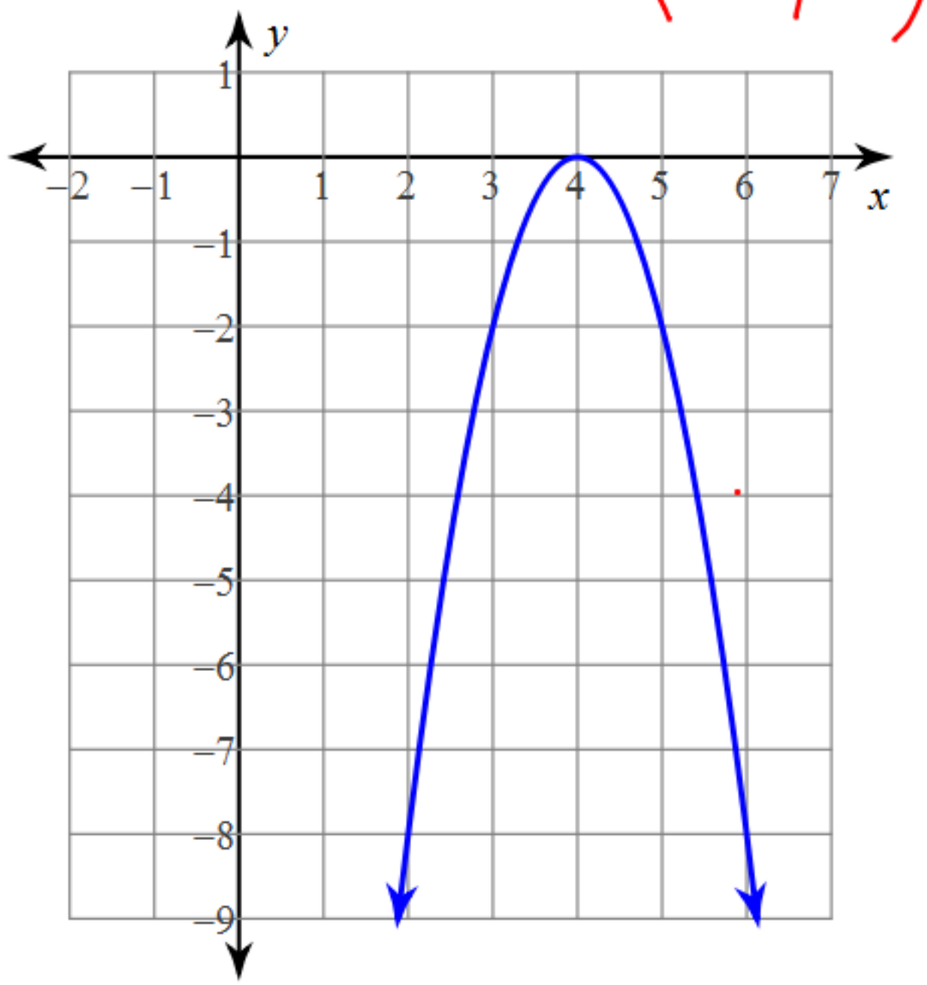
$y = a(x+2)^2 - 5$

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

Use the information provided to write the vertex form equation of each parabola.

5)

vertex (4, 0)

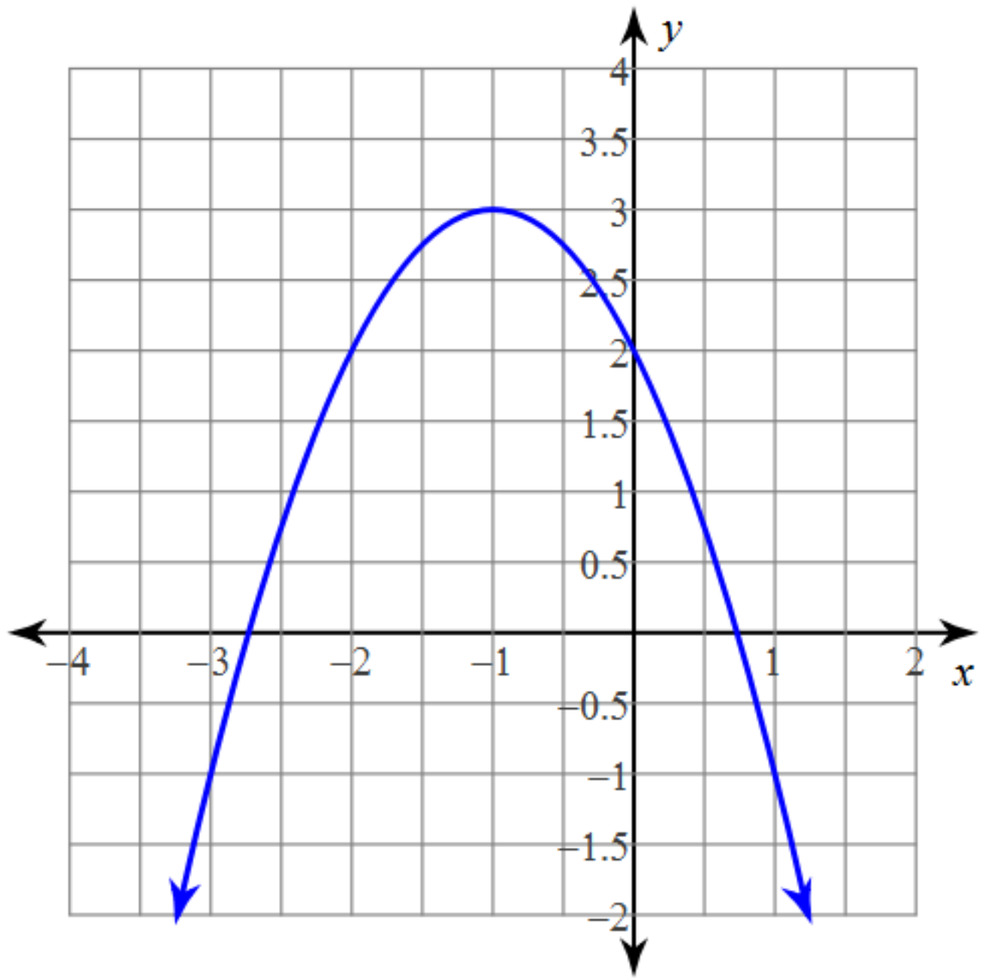


$y = a(x-h)^2 + k$

$y = -2(x-4)^2 + 0$

Use the information provided to write the vertex form equation of each parabola.

6)



vertex $(-1, 3)$ $y = a(x-h)^2 + k$

$y = -(x+1)^2 + 3$