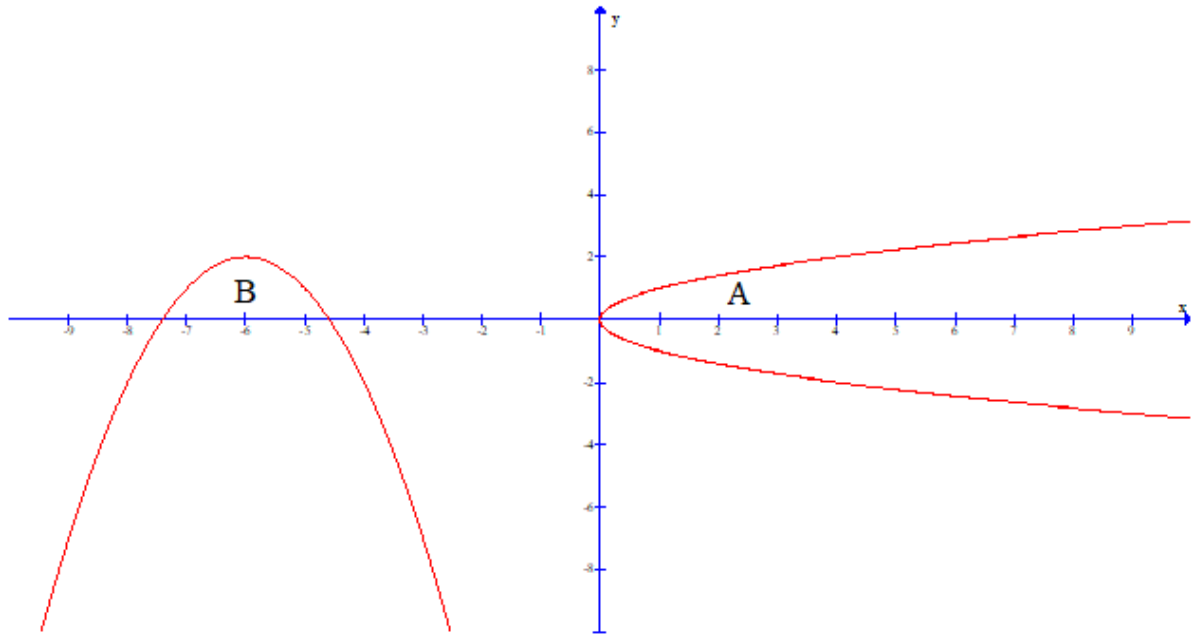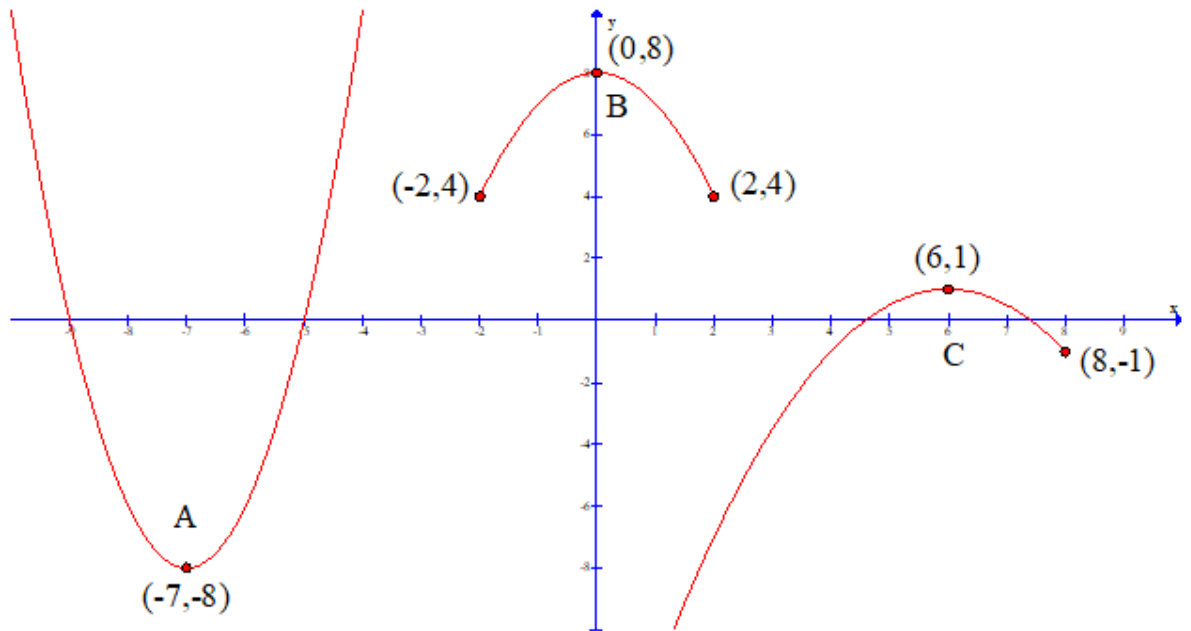# Graphing Quadratic Functions

Practice Questions

1. Of the 2 graphs below, A and B, one is a function and one is not a function. Which one is which?

2. Identify the domain and range of each quadratic function. If there is no endpoint listed, assume that the graph continues to infinity.

(0,8)

B

(-2,4)   (2,4)

(6,1)

C   (8,-1)

A

(-7,-8)

3. Match each graph below with the statement related to the vertex, the equation of the axis of symmetry and the maximum/minimum values.

B

A   C
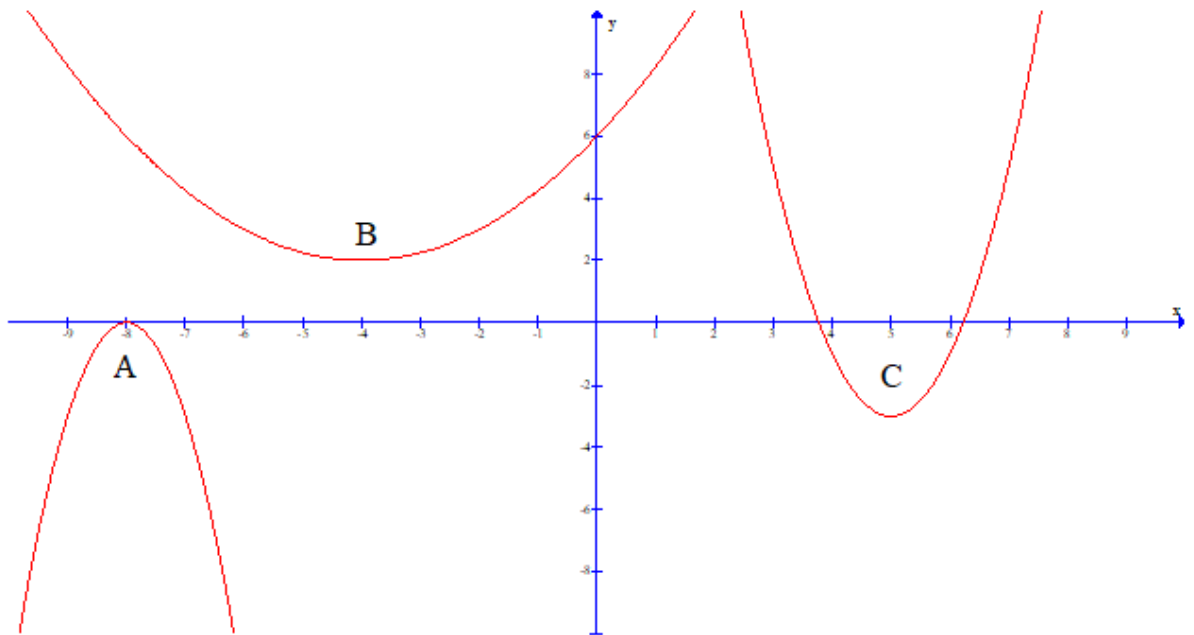
a) The vertex is (-4,2).   ____

b) The equation of the axis of symmetry is $x = 5$.   ____

c) There is a maximum value of 0.   ____

d) There is a minimum value of -3. ____

e) The equation of the axis of symmetry is x = -4. ____

f) The vertex is (-8,0). ____

g) There is a minimum value of 2. ____

h) The vertex is (5,-3). ____

i) The equation of the axis of symmetry is x = -8. ____

4. Determine the **x** and **y** intercepts for the quadratic function defined by the equation: $f(x) = (x - 10)^2 - 81$

5. Sketch an example of a graph that opens down, has a vertex in quadrant 2, has an equation of the axis of symmetry of x = -3 and a maximum value of 6.

6. Sketch an example of a graph that opens up, has a vertex in quadrant 4, has an equation of the axis of symmetry of x = 7 and a minimum value of -3.

7. Two parabolas, A and B, drawn on the same graph have the same equation for the axis of symmetry; x = 2. Parabola B opens down and has a maximum value of -1. The vertical distance between the vertex of Parabola A and Parabola B is 4 units. If Parabola A opens up:
   a) What is the minimum value of Parabola A?
   b) Which quadrant is each vertex situated in?

8. If the range of a quadratic function is [-4, ∞) and the equation of the axis of symmetry is $x = 9$, what is the vertex of the parabola?

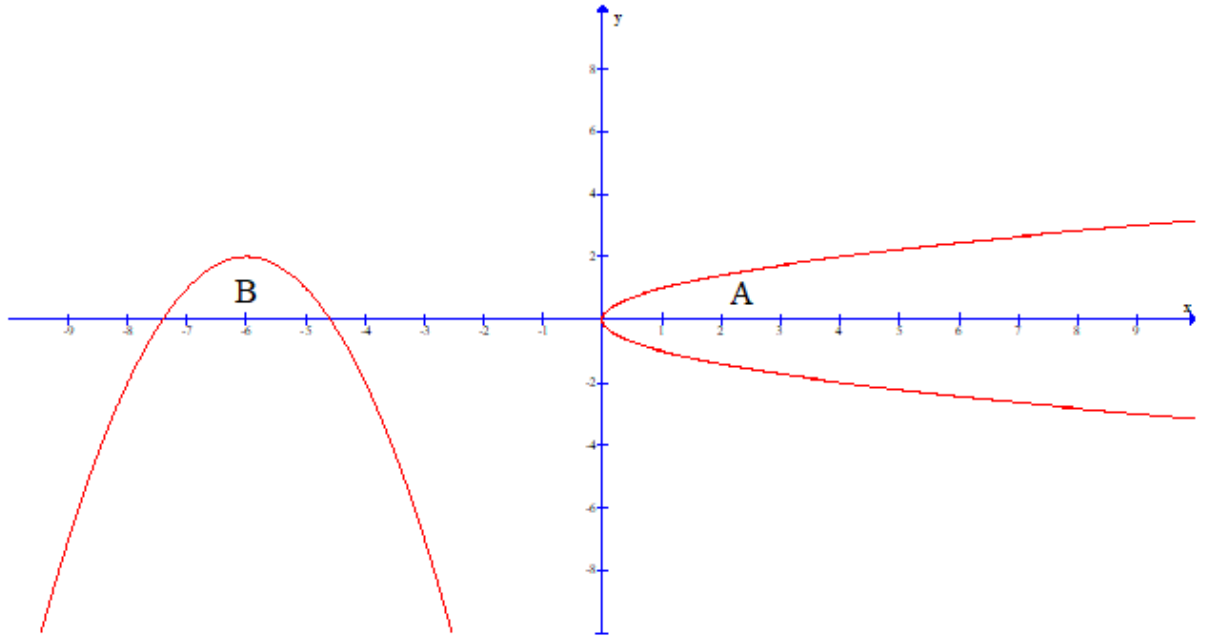9. If one x-intercept of the quadratic function, $f(x) = 2(x + 3)^2 - k$, is 2, find the value of k?

10. If the y-intercept of the quadratic function, $y = k(x - 3)^2 + 196$ is 160, find the x-intercepts.

Practice Questions Answers

1. Of the 2 graphs below, A and B, one is a function and one is not a function. Which one is which?
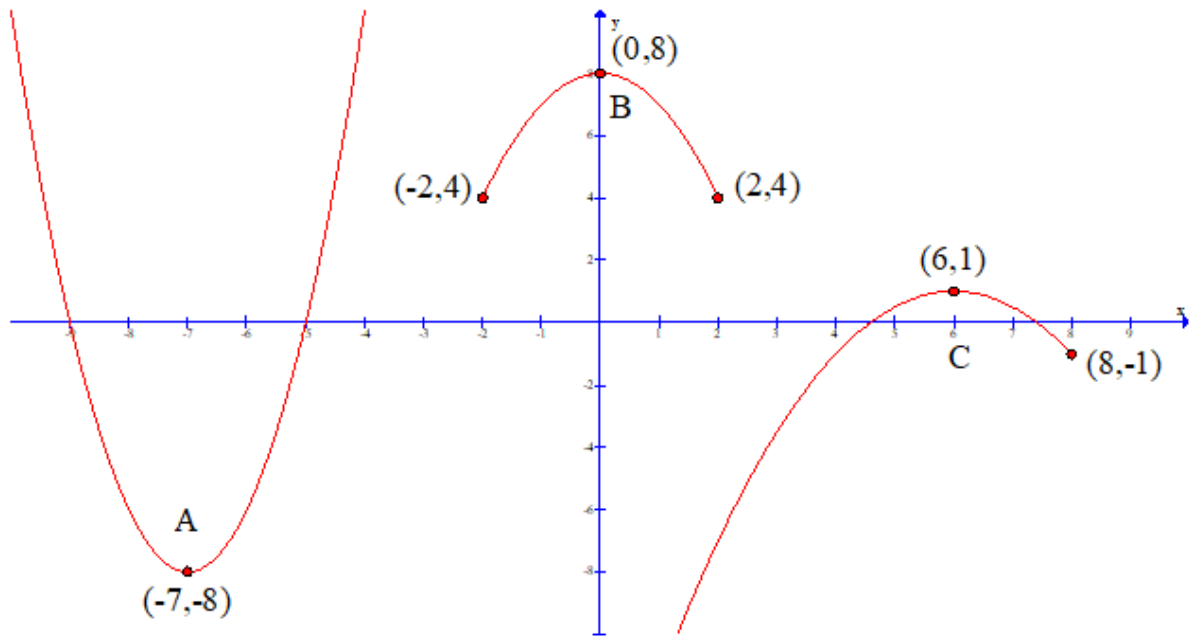

Parabola B is a function and Parabola A is not a function.
In Parabola B, for every **x** coordinate, there is only one **y** coordinate.
In Parabola A, other than at the origin (0,0), for every **x** coordinate, there is more than one **y** coordinate.

2. Identify the domain and range of each quadratic function. If there is no endpoint listed, assume that the graph continues to infinity.

Parabola A:	Domain:	$\{x \mid x \in R\}$	or	$(-\infty, \infty)$
	Range	$\{y \mid y \geq -8, y \in R\}$	or	$[-8, \infty)$
Parabola B	Domain	$\{x \mid -2 \leq x \leq 2, x \in R\}$	or	$[-2,2]$
	Range	$\{y \mid 4 \leq y \leq 8, y \in R\}$	or	$[4,8]$
Parabola C	Domain	$\{x \mid x \leq 8, x \in R\}$	or	$(-\infty, 8]$
	Range	$\{y \mid y \leq 1, y \in R\}$	or	$(-\infty, 1]$

3. Match each graph below with the statement related to the vertex, the equation of the axis of symmetry and the maximum/minimum values.
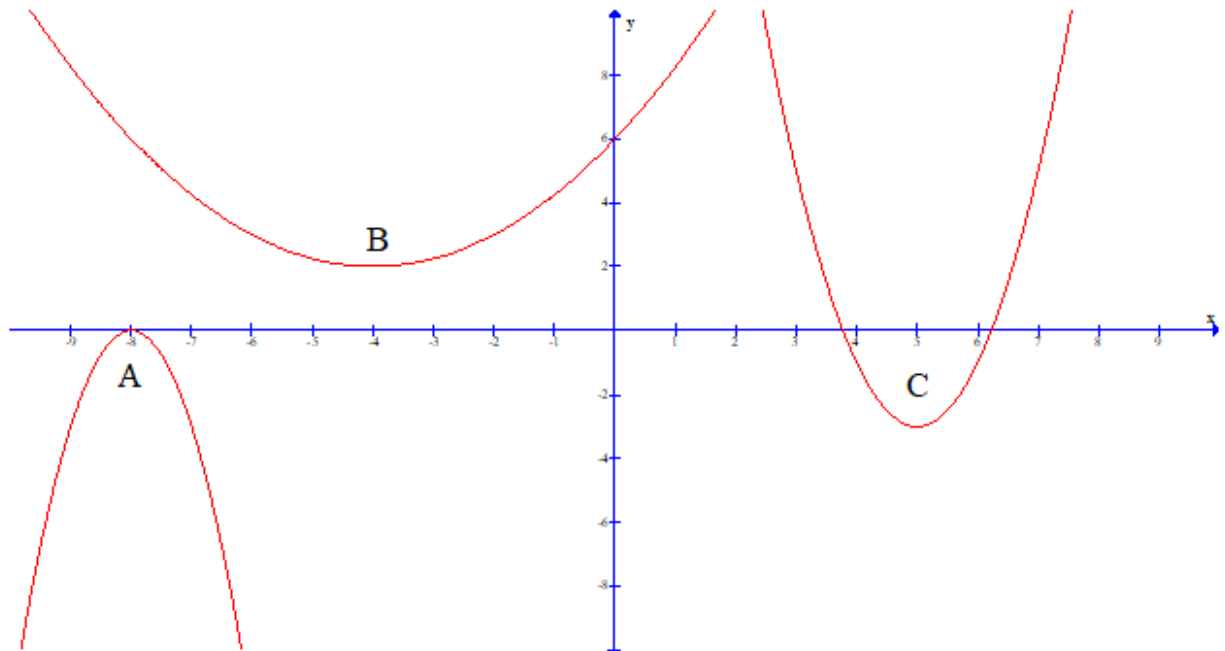
j) The vertex is (-4,2).   B

k) The equation of the axis of symmetry is x = 5.   C

l) There is a maximum value of 0.   A

m) There is a minimum value of -3.   C

n) The equation of the axis of symmetry is x = -4.   B

o) The vertex is (-8,0).   A

p) There is a minimum value of 2.   B

q) The vertex is (5,-3).   C

r) The equation of the axis of symmetry is x = -8.   A

4. Determine the **x** and **y** intercepts for the quadratic function defined by the equation: $f(x) = (x - 10)^2 - 81$

To find the x-intercept(s), set y = 0 and solve for x.

$0 = (x - 10)^2 - 81$

$81 = (x - 10)^2$

$$\sqrt{81} = \sqrt{(x-10)^2}$$

$\pm 9 = x - 10$

$\pm 9 + 10 = x$

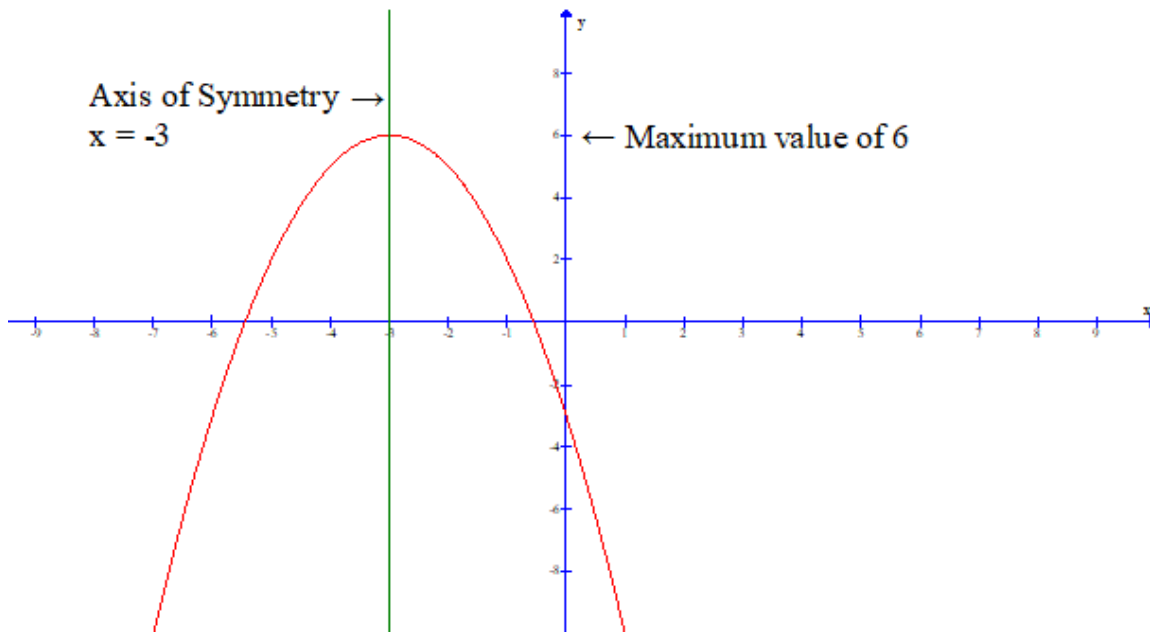|		
x = 9 + 10	or	x = -9 + 10
x = 19	or	x = 1

To determine the y-intercept, set x = 0 and solve for y.
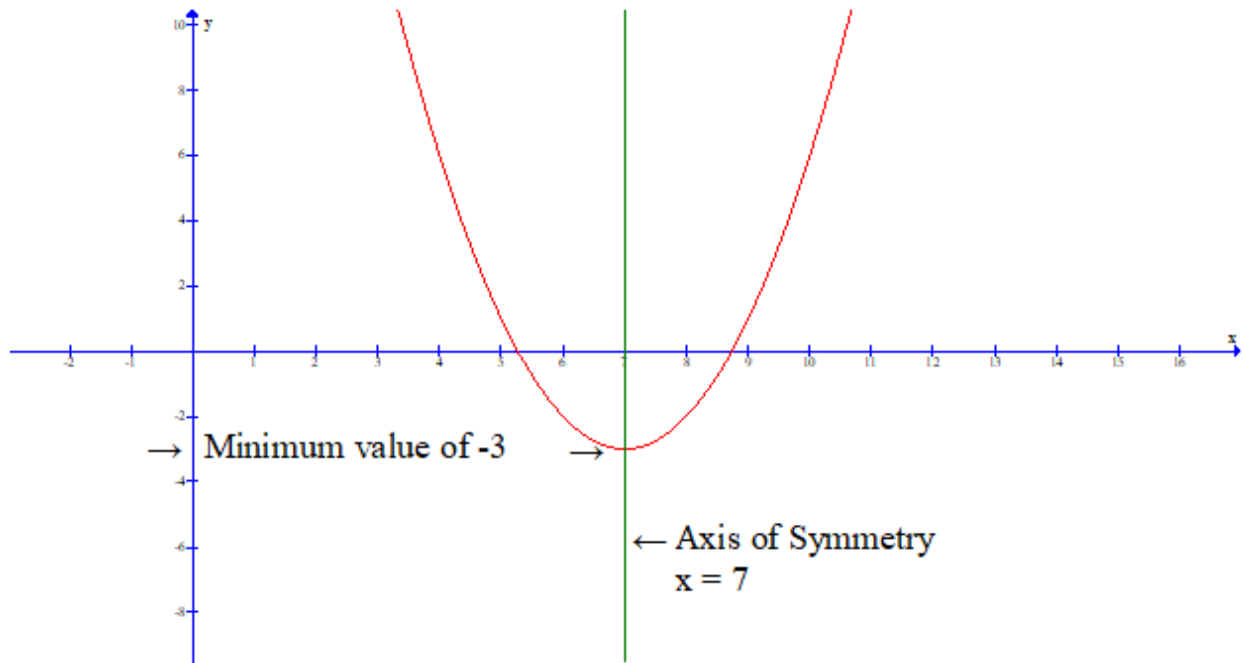
$y = ((0) - 10)^2 - 81$

$y = (-10)^2 - 81$

$y = 100 - 81$

$y = 19$

5. Sketch an example of a graph that opens down, has a vertex in quadrant 2, has an equation of the axis of symmetry of x = -3 and a maximum value of 6.

Axis of Symmetry →
x = -3

← Maximum value of 6

6. Sketch an example of a graph that opens up, has a vertex in quadrant 4, has an equation of the axis of symmetry of x = 7 and a minimum value of -3.

Minimum value of -3

← Axis of Symmetry
x = 7

7. Two parabolas, A and B, drawn on the same graph have the same equation for the axis of symmetry; x = 2. Parabola B opens down and has a maximum value of -1. The vertical distance between the vertex of Parabola A and Parabola B is 4 units. If Parabola A opens up:

a)What is the minimum value of Parabola A?

b)Which quadrant is each vertex situated in?

a) The minimum value for parabola A is 3.

b) The vertex of Parabola A is in quadrant 1 and the vertex for Parabola B is in quadrant 4.
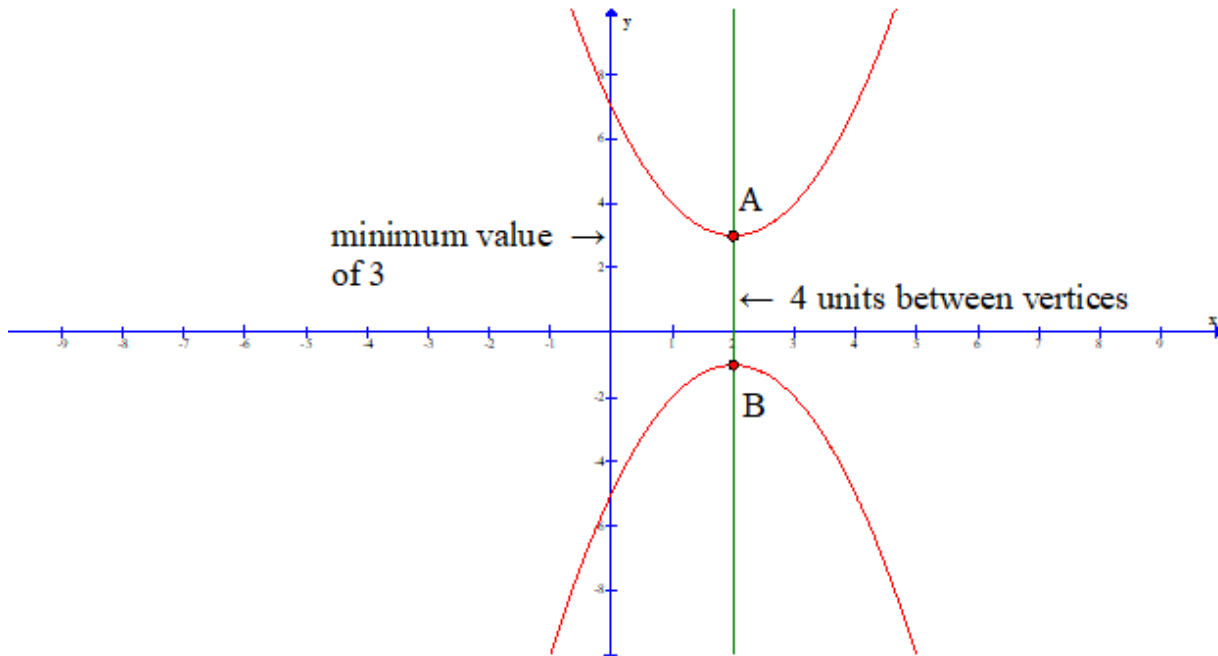
minimum value →
of 3

A

← 4 units between vertices

B

8. If the range of a quadratic function is [-4, ∞) and the equation of the axis of symmetry is x = -9, what is the vertex of the parabola?

x = -9

Vertex (-9,-4)
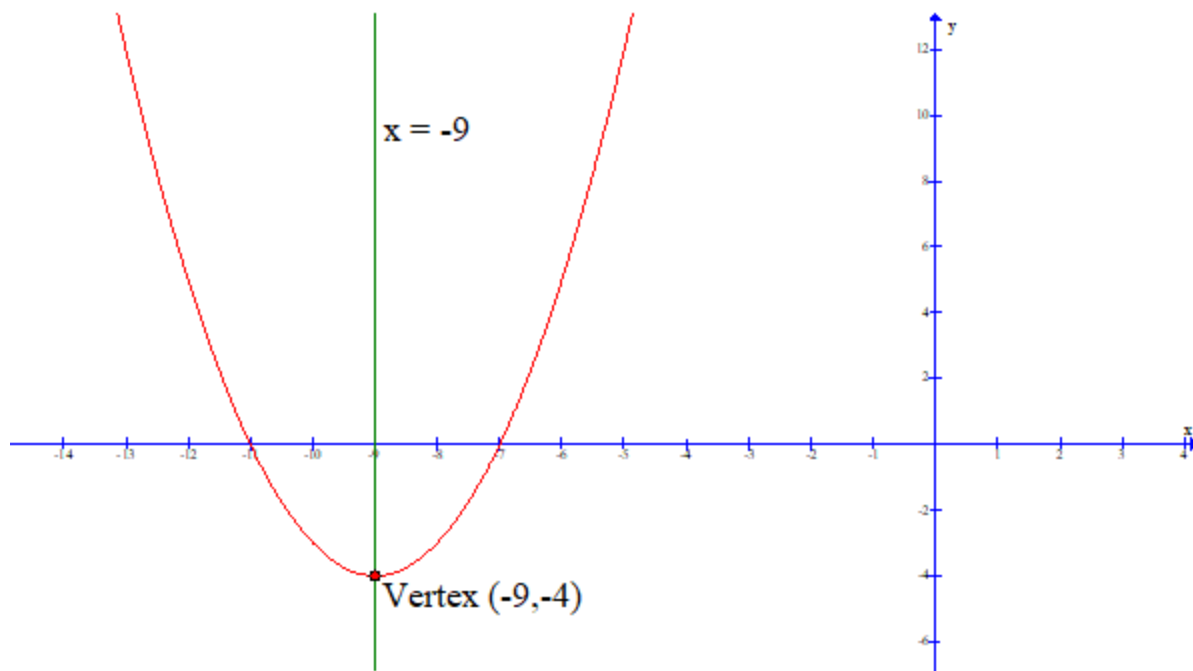
9. If one x-intercept of the quadratic function, $f(x) = 2(x + 3)^2 - k$, is 2, find the value of k?

$0 = 2((2) + 3)^2 - k$

$k = 2(5)^2$

$k = 50$

10. If the y-intercept of the quadratic function, $y = k(x - 3)^2 + 196$ is 160, find the x-intercepts.

$160 = k((0) - 3)^2 + 196$

$-36 = k(-3)^2$

$-36 = 9k$

$k = -4$

To find the x-intercepts, set y = 0 and solve for x.

$0 = -4(x - 3)^2 + 196$

$-196 = -4(x - 3)^2$

$49 = (x - 3)^2$

$\sqrt{49} = \sqrt{(x-3)^2}$

$\pm 7 = x - 3$

$\pm 7 + 3 = x$

$x = 7 + 3$ or $x = -7 + 3$

$x = 10$ or $x = -4$