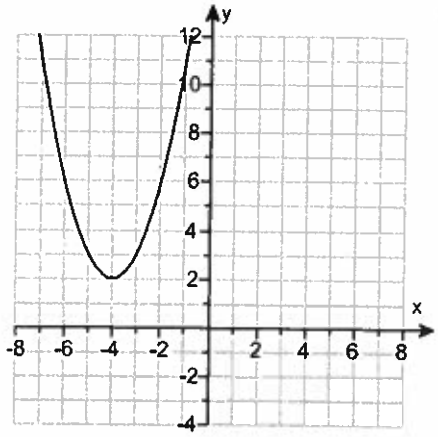
Student: _____ Instructor: Andreas Lazari Assignment: Section 3.1 Homework
Date: _____ Course: Math1111-Summer2018

1. The graph of a quadratic function is given. Select the function's equation from the choices given.

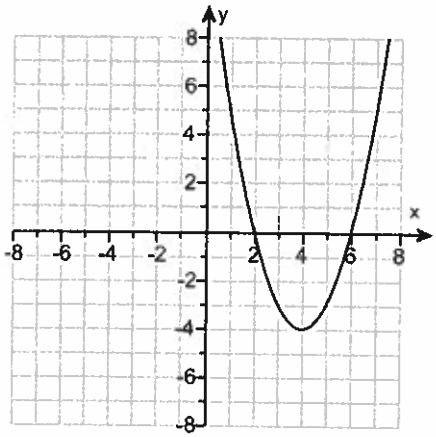


shift.
-4 left
2 up.

Choose the correct equation below.

- A. $f(x) = (x+4)^2 + 2$
- B. $f(x) = (x-4)^2 - 2$
- C. $f(x) = (x-4)^2 + 2$
- D. $f(x) = (x+4)^2 - 2$

2. The graph of a quadratic function is given. Select the function's equation from the choices given.

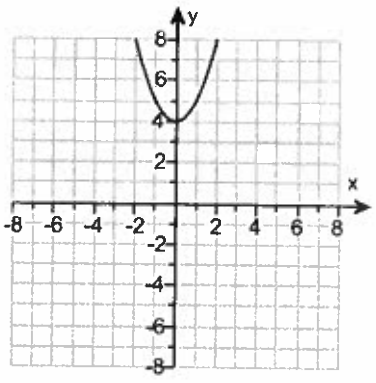


shift.
4 right
-4 down

Choose the correct equation below.

- A. $f(x) = (x-4)^2 - 4$
- B. $f(x) = (x+4)^2 - 4$
- C. $f(x) = (x+4)^2 + 4$
- D. $f(x) = (x-4)^2 + 4$

3. The graph of a quadratic function is given. Select the function's equation from the choices given.

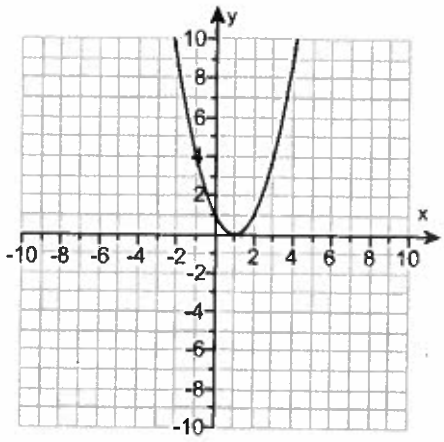


shift
4 up

Choose the correct equation below.

- A. $f(x) = -x^2 + 4$
- B. $f(x) = x^2 - 4$
- C. $f(x) = x^2 + 4$
- D. $f(x) = x^2 - 8x + 16$

4. The graph of a quadratic function is given to the right. Write the function's equation.



Choose the correct equation below.

- A. $f(x) = x^2 - 2x + 1 = (x-1)^2$ Shift 1 right
- B. $f(x) = x^2 + 1$
- C. $f(x) = -x^2 - 1$
- D. $f(x) = x^2 + 2x + 1$

5. In the following exercise, find the coordinates of the vertex for the parabola defined by the given quadratic function.

$f(x) = 3(x-4)^2 - 3$ $f(x) = a(x-h)^2 + k$; Vertex: (h, k).

The vertex is _____. (Type an ordered pair.) Vertex: $(4, -3)$

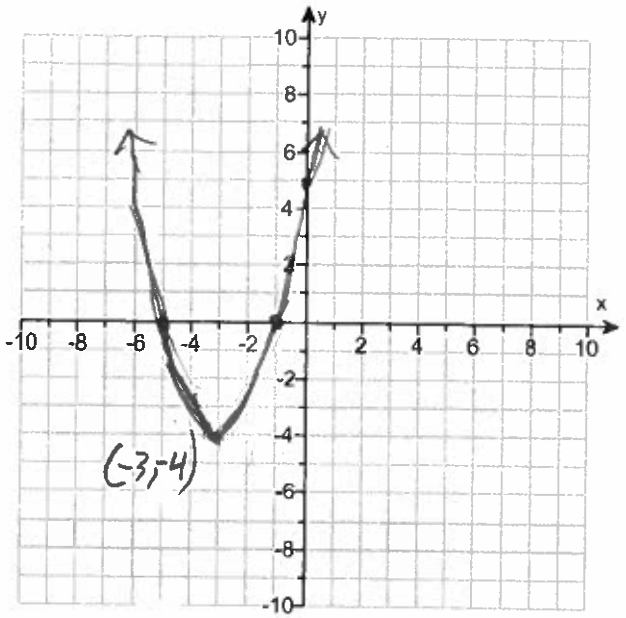
6. In the following exercise, find the coordinates of the vertex for the parabola defined by the given quadratic function.

$f(x) = 4x^2 + 8x + 6$ Vertex: $\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$

The vertex is $(-1, 2)$. (Type an ordered pair.) $-\frac{b}{2a} = -\frac{8}{2(4)} = -1$; $f(-1) = 4(-1)^2 + 8(-1) + 6 = 4 - 8 + 6 = 2$

7. Use the vertex and intercepts to sketch the graph of the quadratic function. Give the equation of the parabola's axis of symmetry. Use the graph to determine the domain and range of the function.

$f(x) = (x+3)^2 - 4$ Vertex: $(-3, -4)$



Use the graphing tool to graph the function. Use the vertex and one of the intercepts when drawing the graph.

The axis of symmetry is $x = -3$.
(Type an equation. Simplify your answer.)
The domain of the function is $(-\infty, \infty)$.
(Type your answer in interval notation.)
The range of the function is $[-4, \infty)$.
(Type your answer in interval notation.)

X-Intercepts: $(x+3)^2 - 4 = 0$

$(x+3)^2 = 4$

$x+3 = \pm\sqrt{4}$

$x+3 = 2 \Rightarrow x = -1 \Rightarrow (-1, 0)$

$x+3 = -2 \Rightarrow x = -5 \Rightarrow (-5, 0)$

8. Use the vertex and intercepts to sketch the graph of the quadratic function. Give the equation for the parabola's axis of symmetry. Use the parabola to identify the function's domain and range.

$f(x) = 9 - (x-1)^2$

Vertex: $(1, 9)$

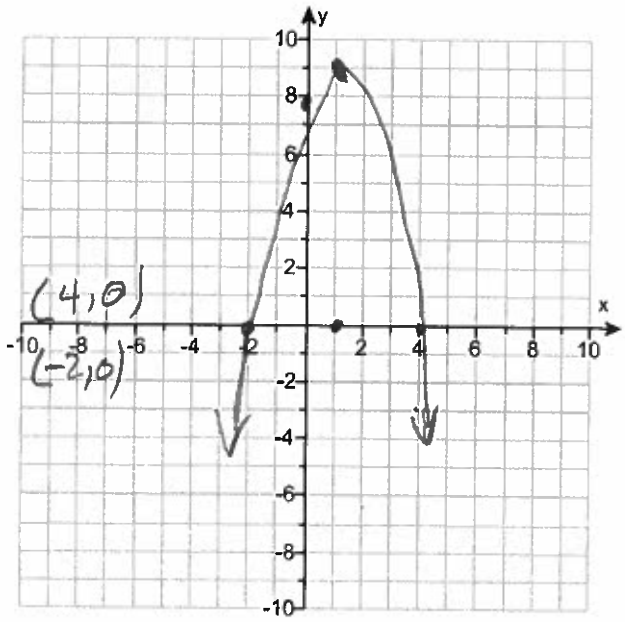
$9-(x-1)^2 = 0 \Rightarrow (x-1)^2 = 9$

$x-1 = \pm 3$

$x = 4$

$x = -2$

Use the graphing tool to graph the equation. Use the vertex and one of the intercepts when drawing the graph.



The axis of symmetry is $x = 1$.
(Type an equation. Simplify your answer.)

Identify the function's domain.

The domain is $(-\infty, \infty)$
(Type the answer in interval notation.)

Identify the function's range.

The range is $(-\infty, 9]$.
(Type the answer in interval notation.)

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9. Consider the function $f(x) = 3x^2 - 24x - 9$.

Find the vertex: $\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right) = (4, -57)$

a. Determine, without graphing, whether the function has a minimum value or a maximum value.
b. Find the minimum or maximum value and determine where it occurs.
c. Identify the function's domain and its range.

$-\frac{b}{2a} = -\frac{-24}{2(3)} = \frac{24}{6} = 4$; $f(4) = 3(4)^2 - 24(4) - 9$

$= 48 - 96 - 9$

$= 48 - 105 = -57$

a. The function has a (1) minimum value.

b. The minimum/maximum value is -57. It occurs at $x =$ 4.

c. The domain of f is $(-\infty, \infty)$. (Type your answer in interval notation.)

The range of f is $[-57, \infty)$. (Type your answer in interval notation.)

(1) ○ maximum
○ minimum

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10. Consider the function $f(x) = -2x^2 + 16x - 9$.

$-\frac{b}{2a} = -\frac{16}{2(-2)} = 4$; $f(-4) = -2(4)^2 + 16(4) - 9$

$= -32 + 64 - 9$

$= 23$

a. Determine, without graphing, whether the function has a minimum value or a maximum value.
b. Find the minimum or maximum value and determine where it occurs.
c. Identify the function's domain and its range.

a. The function has a (1) maximum value.

b. The minimum/maximum value is 23. It occurs at $x =$ 4.

c. The domain of f is $(-\infty, \infty)$. (Type your answer in interval notation.)

The range of f is $(-\infty, 23]$. (Type your answer in interval notation.)

(1) ○ maximum
○ minimum

11. Give the domain and range of the quadratic function whose graph is described.

The vertex is $(-9, -6)$ and the parabola opens up. → Minimum

The domain of f is $(-\infty, \infty)$. (Type your answer in interval notation.)

The range of the function is $[-6, \infty)$. (Type your answer in interval notation.)

1. A. $f(x) = (x+4)^2 + 2$

2. A. $f(x) = (x-4)^2 - 4$

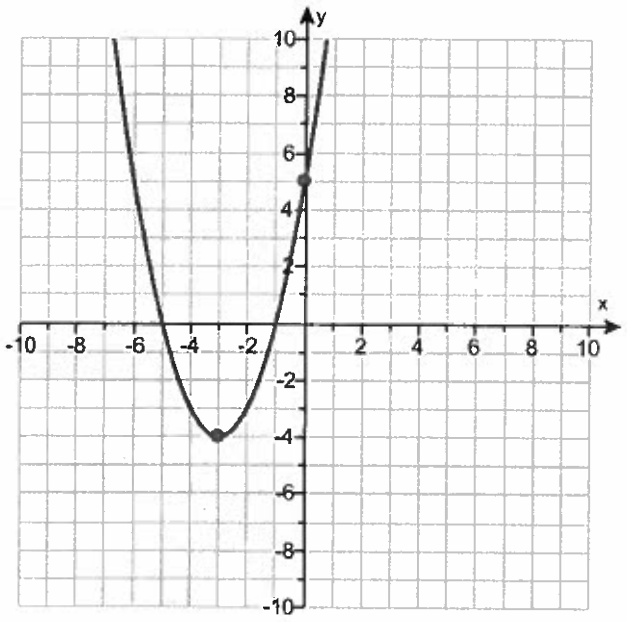
3. C. $f(x) = x^2 + 4$

4. A. $f(x) = x^2 - 2x + 1$

5. $(4, -3)$

6. $(-1,2)$

7.

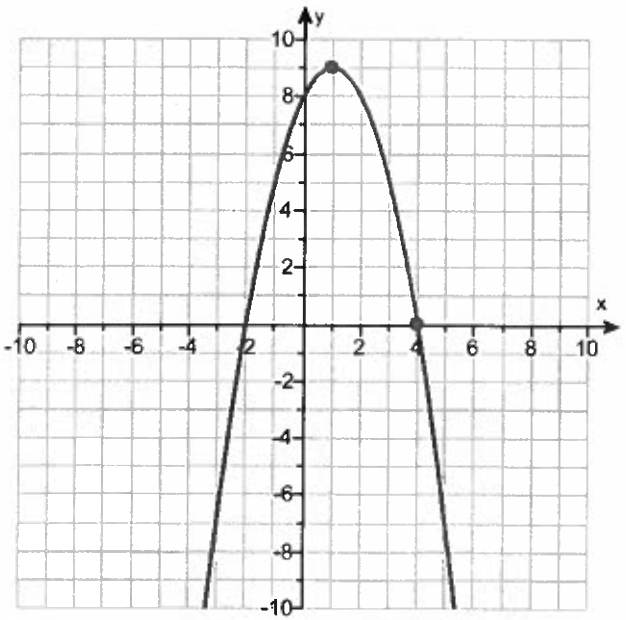


$x = -3$

$(-\infty, \infty)$

$[-4, \infty)$

8.



$x = 1$

$(-\infty,\infty)$

$(-\infty,9]$

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9. (1) minimum

-57

4

$(-\infty,\infty)$

$[-57,\infty)$

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10. (1) maximum

23

4

$(-\infty,\infty)$

$(-\infty,23]$

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11. $(-\infty,\infty)$

$[-6,\infty)$
