

LESSON
19-1

Understanding Quadratic Functions

Practice and Problem Solving: A/B

For Exercises 1–4, tell whether the graph of the function

- a. opens upward or downward
- b. has a maximum or minimum
- c. is a reflection across the x-axis of the parent function
- d. is a stretch or a compression (shrink)?

1. $y = 3x^2$

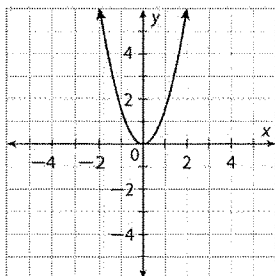
2. $y = -4x^2$

3. $y = -3.1x^2$

4. $y = 0.9x^2$

Determine the characteristics of each quadratic function.

5. $y = 1.5x^2$



Vertex: _____

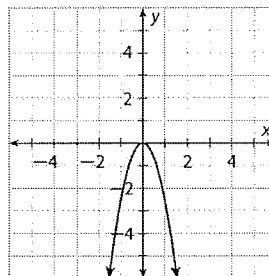
Minimum (if any): _____

Maximum (if any): _____

Parent function reflected across x-axis? _____

Stretch or shrink? _____

6. $y = -2.5x^2$



Vertex: _____

Minimum (if any): _____

Maximum (if any): _____

Parent function reflected across x-axis? _____

Stretch or shrink? _____

Solve.

7. A quadratic function has the form $y = ax^2$ for some nonzero value of a and $(4, 32)$ is on the graph. What is the value of a ? _____

UNIT 8 Quadratic Functions

MODULE 19 Graphing Quadratic Functions

LESSON 19-1

Practice and Problem Solving: A/B

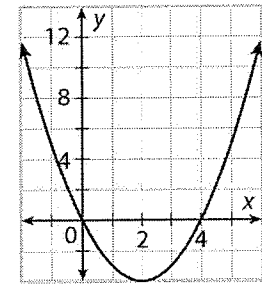
1. a. upward
b. minimum 0
c. no
d. stretch
2. a. downward
b. maximum 0
c. yes
d. stretch
3. a. downward
b. maximum 0
c. yes
d. stretch
4. a. upward
b. minimum
c. no
d. compression
5. (0, 0), 0, none, no, stretch
6. (0, 0), none, 0, yes, stretch
7. 2

LESSON
19-2 **Transforming Quadratic Functions**
Practice and Problem Solving: A/B

A parabola has the equation $f(x) = 2(x + 3)^2 - 8$. Complete:

- The vertex is _____.
- The graph opens _____.
- The function has a minimum value of _____.

The following graph is a translation of $y = x^2$. Use it for 4–6.



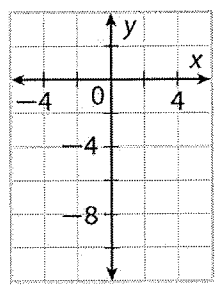
- What is the vertical translation?

- What is the horizontal translation?

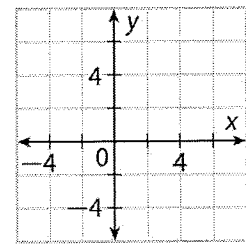
- What is the quadratic equation for the graph? _____

Graph the following parabolas.

7. $y = -2(x + 1)^2 + 2$

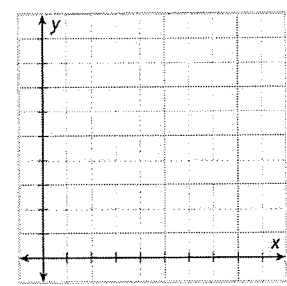


8. $y = \frac{1}{2}(x - 2)^2 - 3$



A ball follows a parabolic path represented by $f(x) = -(x - 4)^2 + 8$. Use this equation for 9–12.

- What is the vertex? _____
- What is the axis of symmetry? _____
- Find two points on either side of the axis.
_____ and _____
- Graph the parabola.



LESSON 19-2

Practice and Problem Solving: A/B

1. $(-3, -8)$

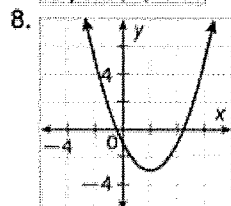
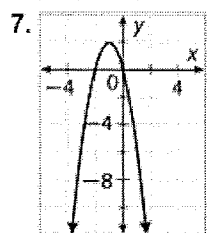
2. up

3. -8

4. 2

5. -4

6. $y = (x - 2)^2 - 4$



9. Vertex: $(4, 8)$

10. Axis of Symmetry: $x = 4$

LESSON
19-3

Interpreting Vertex Form and Standard Form

Practice and Problem Solving: A/B

Determine if each function is a quadratic function.

1. $y = 2x^2 - 3x + 5$

2. $y = 2x - 4$

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

Change the vertex form to standard quadratic form.

4. $y = 2(x + 3)^2 - 6$

5. $y = -0.5(x + 6)^2 + 10$

6. $y = 2(x - 4)^2 - 5$

7. $y = 3(x + 0.5)^2 - 2.4$

Find the vertex, axis of symmetry, and maximum or minimum value of each quadratic equation.

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

9. $y = -2(x + 4)^2 - 1$

LESSON 19-3

Practice and Problem Solving: A/B

1. Quadratic
2. Not quadratic
3. Not quadratic
4. $y = 2x^2 + 12x + 12$
5. $y = 0.5x^2 + 6x + 28$
6. $y = 2x^2 - 16x + 27$
7. $y = 3x^2 + 3x - 1.65$
8. Vertex (5,2) axis of symmetry $x = 5$, minimum value: 2
9. Vertex (-4, -1) axis of symmetry $x = -4$, maximum value: -1