# LESSON 19-2 Transforming Quadratic Functions

***Practice and Problem Solving: A/B***

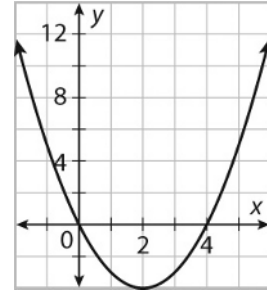**A parabola has the equation $f(x) = 2(x - 3)^2 - 4$. Complete:**

1. The vertex is _____.        2. The graph opens _____.

3. The function has a minimum value of _____.

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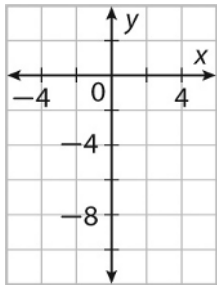
4. What is the horizontal translation?

   _____

5. What is the vertical translation?

   _____

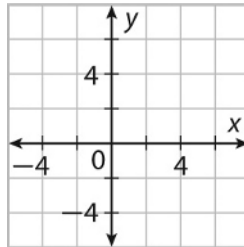6. What is the quadratic equation for the graph? _____

**Graph the following parabolas.**
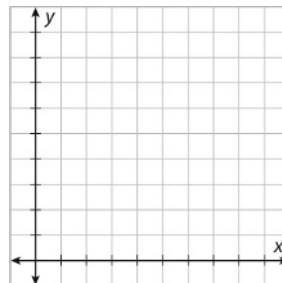
7. $y = -2(x + 1)^2 + 2$          8. $y = \dfrac{1}{2}(x - 2)^2 - 3$

**A ball follows a parabolic path represented by $f(x) = -2(x - 5)^2 + 9$.**
**Use this equation for 9–12.**

9. What is the vertex? _____

10. What is the axis of symmetry? _____

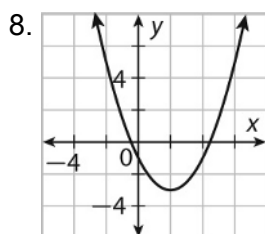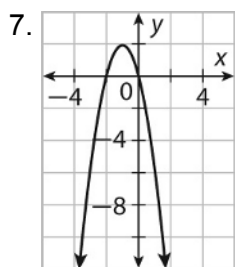11. Find two points on either side of the axis.

    _____ and _____

12. Graph the parabola.

3. The graph of $g(x)$ is a parabola that opens downward and has the same width as the graph of $f(x) = x^2$. Possible explanation: The expression $-x^2$ is equivalent to $-1x^2$, and so the value of $a$ is $-1$. Since the value of $a$ is negative, the graph is the reflection of $f(x) = x^2$ when it is reflected across the $x$-axis. That is the reason the graph of $g(x)$ opens downward. For every $x$, the value of $g(x)$ is the opposite of the value of $f(x)$. That is the reason the graph of $g(x)$ has the same width as the graph of $f(x)$.

## LESSON 19-2
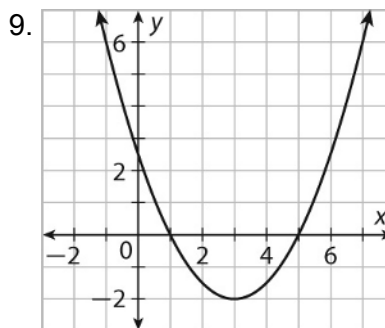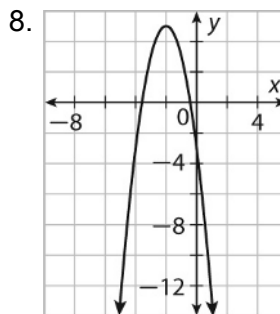
### Practice and Problem Solving: A/B

1. $(3, -4)$
2. up
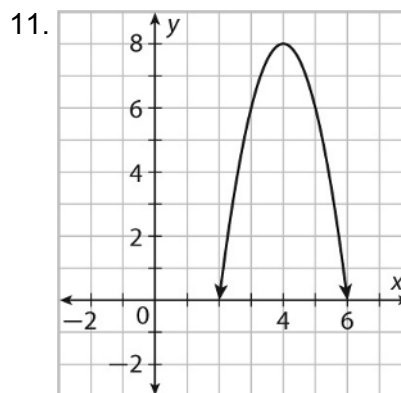3. $-4$
4. 2
5. $-4$
6. $y = (x - 2)^2 - 4$
7. 
8. 
9. $(5, 9)$
10. $x = 5$
11. $(4, 7)$ and $(6, 7)$
12. 

### Practice and Problem Solving: C

1. $(3, 4)$
2. down
3. 4
4. $-3$
5. 2
6. positive
7. $y = (x + 3)^2 + 2$
8. 
9. 
10. $(4, 8)$
11. 
12. At $x = 2$ and $x = 6$ the ball is at $y = 0$ or ground level.

### Practice and Problem Solving: Modified

1. 3 to the right
2. down 4
3. $(3, -4)$