NAME _____ DATE _____

Module Test B

Module 14

Determine the direction each parabola opens by inspection.

1. $x = 2y^2$ **right**
2. $y = (x + 3)^2 - 4$ **up**
3. $x = -5(y + 3)^2 - 4$ **left**
4. $y = -3(x + 1)^2$ **down**
5. $x = y^2 - 7y + 8$ **right**
6. $y = -2x^2 + x + 3$ **down**
7. $x = -(y + 2)^2 + 6$ **left**
8. $y = 4x^2 - 1$ **up**

9. **Given the equation of the parabola $y = x^2 - 8x + 7$, answer the following:**

a. Find the axis of symmetry using the Axis of Symmetry Formula.

$x = 4$

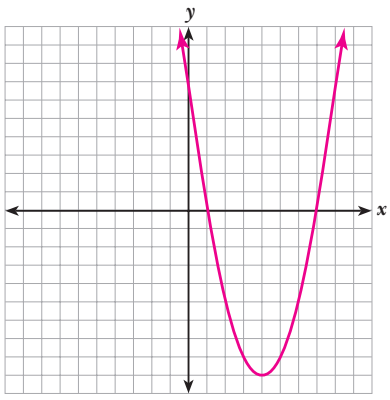
b. Identify the vertex.

(4, –9)

c. Find four other points on the graph.

Possible answers: (2, –5), (3, –8), (5, –8), (6, –5)

d. Graph the parabola.



10. **Given the equation of the parabola $x = -y^2 - 2y$, answer the following:**

a. Find the axis of symmetry using the Axis of Symmetry Formula.

$y = -1$

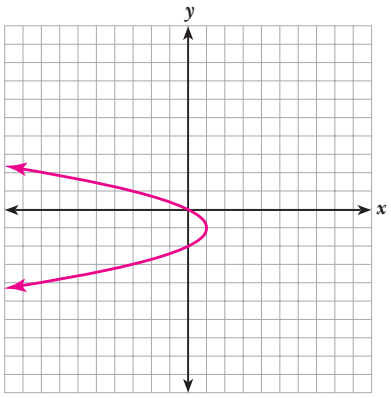
b. Identify the vertex.

(1, –1)

c. Find four other points on the graph.

Possible answers: (–3, –3), (0, –2), (0, 0), (–3, 1)

d. Graph the parabola.



11. Given the equation of the parabola $y = -3x^2 - 12x - 5$, answer the following:

a. Complete the square to write the equation in the form $y = a(x - h)^2 + k$.

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

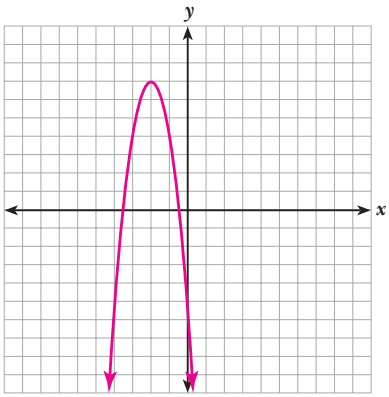
b. Identify the vertex.

(–2, 7)

c. Find four other points on the graph.

Possible answers: (–4, –5), (–3, 4), (–1, 4), (0, –5)

d. Graph the parabola.



12. Determine whether each statement is true or false.

a. The graph of $y = x^2$ is narrower than the graph of $y = 2x^2$.

False

b. The graph of $x = -2y^2$ is narrower than the graph of $x = -y^2$.

True

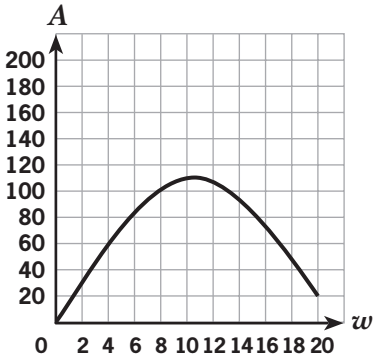
c. The graph of $x = 4y^2 - y$ is wider than the graph of $x = y^2 + 3y$.

False

d. The graph of $y = -x^2 + 6x - 1$ is wider than the graph of $y = 2x^2 - 5x + 4$.

True

13. A rectangular yard is to be enclosed using 42 feet of fencing. The graph represents the width and area of this yard.



a. Using w for width and l for length, write an equation for the perimeter of the yard.

$2l + 2w = 42$

b. Using the perimeter equation in the previous problem, solve for l in terms of w.

$l = 21 - w$

c. Write an equation to find the maximum area of this rectangular yard in one variable. Put the equation in standard form.

$A = w(21 - w)$; $A = -w^2 + 21w$

d. Using the graph, estimate the width that would maximize the area of the yard.

$w = 10.5$ feet

e. Estimate the maximum area of the yard.

about 110 square feet

14. The vertex of the equation $y = -4x^2 + 16x - 1$ is _____.

a. (0, –1) **b.** (2, 1) **c.** (2, 15) **d.** (4, 11)

15. The height of a leaf falling from a tree is modeled by the equation $h = -16t^2 + 64$, where h is in feet and t is in seconds. How long did it take for the leaf to hit the ground?

a. one second **b.** two seconds **c.** three seconds **d.** four seconds

Answer the following questions:

16. Compare the graphs of $y = \frac{1}{2}x^2 + 3$ and $y = -\frac{1}{2}(x + 3)^2$.

Both equations have the same width because $\left|\frac{1}{2}\right| = \left|-\frac{1}{2}\right|$. The graph of $y = -\frac{1}{2}x^2 + 3$ has a vertex of (0, 3) and axis of symmetry $x = 0$, while the graph of $y = -\frac{1}{2}(x + 3)^2$ has a vertex of (–3, 0) and an axis of symmetry $x = -3$. The graph of $y = \frac{1}{2}x^2 + 3$ opens up because $a = \frac{1}{2}$ is positive, while the graph of $-\frac{1}{2}(x + 3)^2$ curves down because $a = -\frac{1}{2}$ is negative.

17. Give an example of a quadratic relation that is *not* a function.

Equations of the form $x = ay^2 + by + c$ and $x = a(y - k)^2 + h$ are not functions.