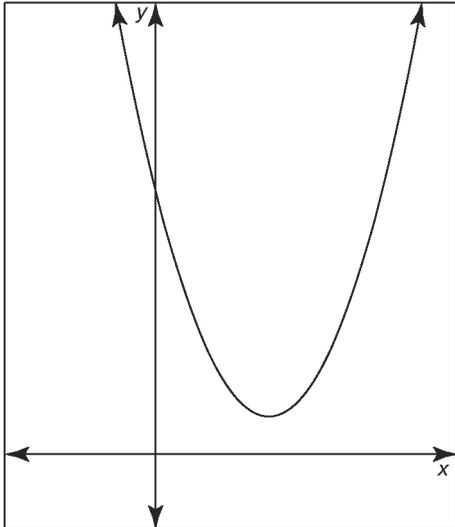


## Chapter 3 Test

### Multiple Choice

For #1 to 5, select the best answer.

- Which of the following does not represent a quadratic function?
  - $y = (x - 3)^2 + 8$
  - $y = (x + 6) - 2$
  - $y = 3x^2 - 7x + 2$
  - $y + 3 = x^2$
- Which of the following statements is true about the graph of the function  $y = x^2 - 1$ ?
  - It has two  $x$ -intercepts.
  - It opens downward.
  - The axis of symmetry is  $x = 1$ .
  - The vertex is at the origin.
- What are the coordinates of the vertex for the quadratic function  $y = -4(x + 7)^2 + 5$ ?
  - (7, 5)
  - (7, -5)
  - (-7, 5)
  - (-7, -5)
- Which of the following statements is true about the quadratic function shown?

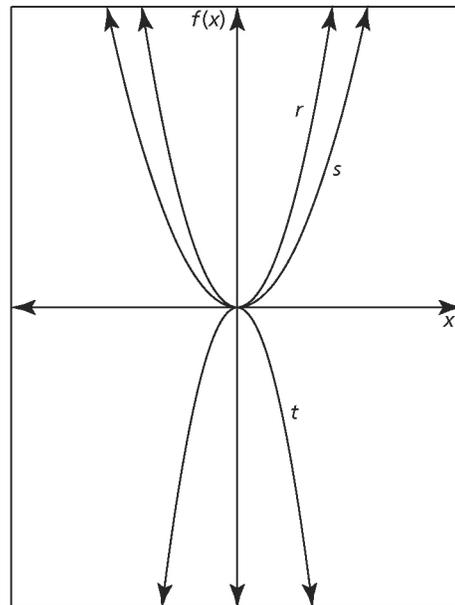


- The equation of the axis of symmetry could be  $2x - 5 = 0$ .
- The range could be  $\{y \mid y < 2, y \in \mathbb{R}\}$ .
- The vertex could be (3, -5).
- The  $x$ -intercept could have a value of 5.

- Suppose that the graph of the function  $f(x) = 2x^2$  is reflected in the  $x$ -axis, translated 2 units to the left, and then translated 5 units upward. What could the equation of the quadratic function of the resultant graph be?
  - $f(x) = -(x + 2)^2 + 5$
  - $f(x) = 2(-x - 2)^2 + 5$
  - $f(x) = -2(x - 2)^2 + 5$
  - $f(x) = -2(x + 2)^2 + 5$

### Short Answer

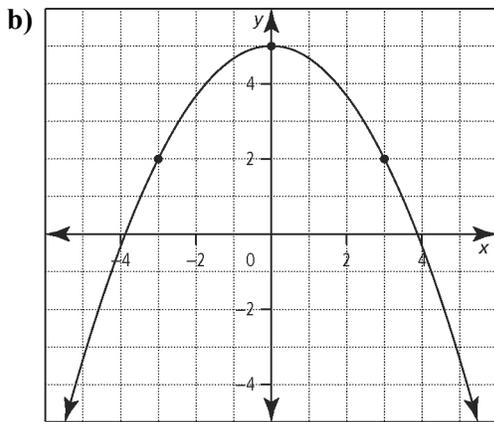
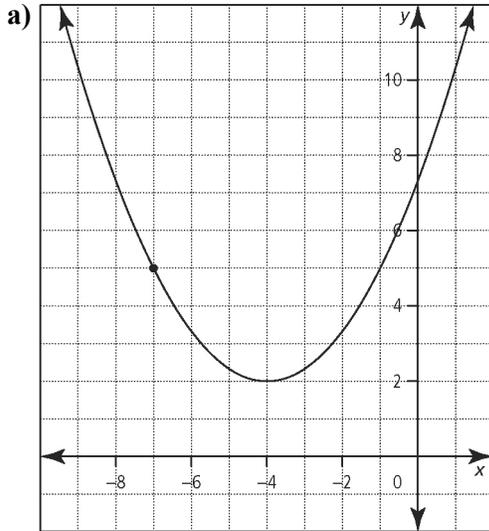
- Identify the coordinate,  $x$  or  $y$ , that is affected in every point  $(x, y)$  on the graph of  $y = x^2$  by the following transformations.
  - horizontal translation
  - vertical translation
  - reflection in the  $x$ -axis
- Three graphs of the form  $f(x) = x^2$  are shown. Identify the graph(s) that fit each description.



- $a > 0$
- $a < 0$



8. Write a quadratic function in the form  $f(x) = a(x - p)^2 + q$  for each graph.



9. Rewrite each quadratic function in vertex form by completing the square. Determine the coordinates of the vertex.

a)  $y = x^2 - 4x + 12$

b)  $y = -\frac{1}{4}x^2 - 4x - 18$

### Extended Response

10. Determine the following characteristics of

the quadratic function  $y = \frac{1}{2}x^2 - 6x - 3$ .

- vertex
- axis of symmetry
- direction of opening
- domain
- range
- exact value for  $x$ -intercepts
- $y$ -intercept

11. Last year, a music theatre charged \$60 admission, and at that price an average of 200 seats were sold for each show. A survey predicts that for every \$5 increase in ticket price, ten fewer people would be expected to attend a show.

- a) Write a quadratic function to model this situation.
- b) Determine the admission price that would maximize revenue.
- c) What is the maximum revenue?
- d) How many seats would be empty when revenue is maximized compared to last year's average?

