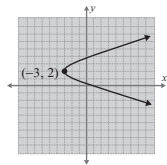
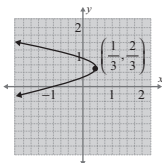


**Margin Exercise Answers**

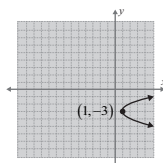
1. vertex:  $(-3, 2)$   $y$ -intercepts:  $(0, 2 - \sqrt{3})$ ,  $(0, 2 + \sqrt{3})$  line of symmetry:  $y = 2$ ;



2. vertex:  $(\frac{1}{3}, \frac{2}{3})$ ;  $y$ -intercepts:  $(0, \frac{1}{3})$  and  $(0, 1)$  line of symmetry:  $y = \frac{2}{3}$



3.  $y$ -intercepts: none



## 18.2 Exercises

### Concept Check

**Fill-in-the-Blank.** Complete each sentence using information found in this section.

- Four conic sections are the \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
- The basic form of a parabola that opens \_\_\_\_\_ or \_\_\_\_\_ is  $x = ay^2$ .
- The equations of \_\_\_\_\_ parabolas can be written in the form  $y = a(x - h)^2 + k$ , where  $a \neq 0$ .
- The equations of \_\_\_\_\_ parabolas can be written in the form  $x = a(y - h)^2 + k$ , where  $a \neq 0$ .
- By setting  $x = \underline{\hspace{1cm}}$  and solving  $0 = ay^2 + by + c$ , we can determine the \_\_\_\_\_.
- The vertex of a parabola is at the point \_\_\_\_\_.

**True/False.** Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

- Not all parabolas are functions.
- Parabolas open down if  $a > 0$  and open up if  $a < 0$ .
- The line  $x = h$  is the line of symmetry for a horizontal parabola.

### Practice

For the given equations, **a.** find the vertex, **b.** find the  $y$ -intercept, **c.** find the line of symmetry, and **d.** sketch the graph. See Examples 1 and 2.

- $x = y^2 + 4$
- $x = y^2 - 5$
- $y + 3 = x^2$
- $y - 2 = x^2$

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

6.  $x = 3y^2 + 1$

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

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

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

10.  $x+3 = (y-5)^2$

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

12.  $y-5 = (x-3)^2$

13.  $x = y^2 + 4y + 4$

14.  $x = y^2 - 8y + 16$

15.  $x = -y^2 + 10y - 25$

16.  $x = -y^2 - 6y - 9$

17.  $y = x^2 + 6x + 5$

18.  $y = x^2 + 4x + 6$

19.  $y = -x^2 - 4x + 5$

20.  $y = -x^2 + 2x + 5$

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

22.  $x = y^2 + 8y + 12$

23.  $y = 2x^2 + x - 1$

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

25.  $x = -2y^2 + 5y - 2$


26.  $x = 3y^2 + 5y + 2$

27.  $x = 3y^2 + 6y - 5$

28.  $x = 4y^2 - 4y - 15$

29.  $y = 4x^2 - 12x + 9$

30.  $y = -5x^2 + 10x + 2$

 Use a graphing calculator to graph each of the parabolas. Use the trace and zoom features of the calculator to estimate the  $y$ -intercepts of the parabola. See Example 3. (See Section 10.5 to review the trace and zoom features on a TI-84 Plus graphing calculator.)

31.  $x = 2y^2 - 3$

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

33.  $x = -y^2 + 2y$

34.  $x = y^2 - 5y$

35.  $x = 2y^2 + y + 1$

36.  $x = -y^2 - 4y + 1$

37.  $x = 4y^2 + 8y - 7$

38.  $x = 3y^2 + 3y + 2$

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

40.  $x = -5y^2 - 10y - 4$

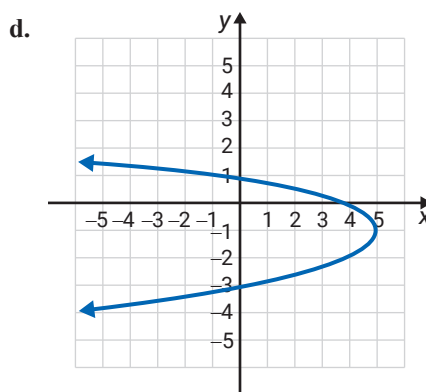
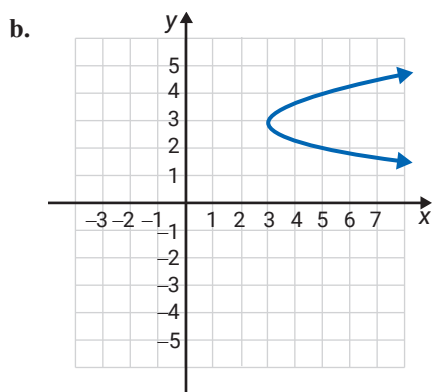
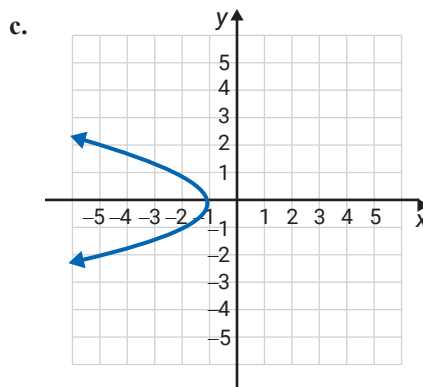
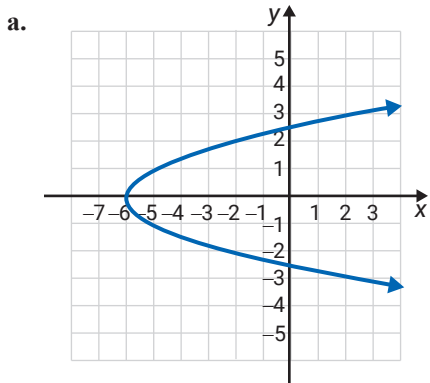
Use your knowledge of parabolas and equations to match the equation with the graph.

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

43.  $x = -y^2 - 1$

42.  $x = -(y+1)^2 + 5$

44.  $x = y^2 - 6$



## Writing & Thinking

45. For  $x = ay^2 + by + c$  we know that the graph of the parabola opens to the right if  $a > 0$  and to the left if  $a < 0$ . Discuss which values of  $a$  will cause the parabola to be wider and which will cause it to be narrower than the graph of  $x = y^2$ .