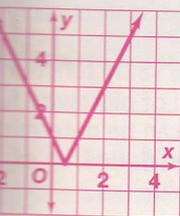
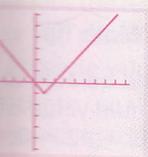


## Additional Examples

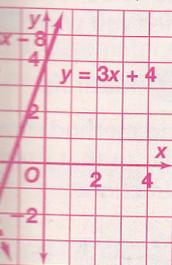
Graph  $y = |2x - 1|$  by using a graphing calculator.



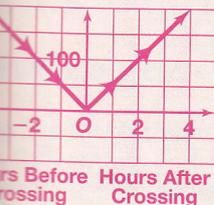
Graph  $y = |x - 1| - 1$  on a graphing calculator.



Graph the definition of absolute value on a graphing calculator. Graph  $y = |3x + 6| - 2$ .



A train traveling on a straight track at 50 mi/h passes a certain point halfway through its trip each day. Sketch a graph of the trip based on its distance and time from the crossing.



Students describe the shape of the graph of a function of the form  $y = |mx + b|$ , where  $m \neq 0$ . The graph looks like an angle.

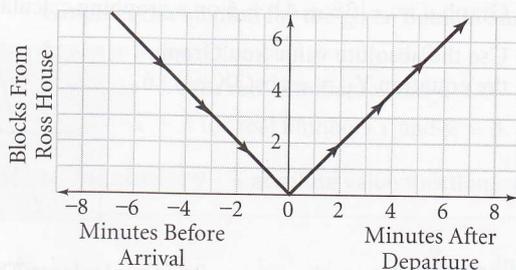


### Real-World Connection

According to legend, Betsy Ross made the first flag of the United States in her house in Philadelphia, Pennsylvania.

## 4 EXAMPLE Real-World Connection

**Travel** Suppose you pass the Betsy Ross House halfway along your trip to school each morning. You walk at a rate of one city block per minute. Sketch a graph of your trip to school based on your distance and time from the Betsy Ross House.



The equation  $d = |t|$  models your distance from the Betsy Ross House.

### Check Understanding

- 4 a. **Critical Thinking** Suppose you ride your bicycle to school at a rate of three city blocks per minute. How would the graph of your trip to school change?  
b. Sketch a new graph.



The graph would get narrower.

## EXERCISES

### Practice and Problem Solving

#### A Practice by Example

**Example 1**  
(page 86)

1.  $y = |4x|$                       2.  $y = |4x| - 1$                       3.  $y = |4x - 1|$   
4.  $y = |-3x|$                       5.  $y = |-3x| + 2$                       6.  $y = |-3x + 2|$   
7.  $y = -|2x|$                       8.  $y = -|2x| + 5$                       9.  $y = -|2x + 5|$

1-18. See back of book.

**Example 2**  
(page 87)



Graph each equation on a graphing calculator. Then sketch the graph.

10.  $y = |x + 2| - 4$                       11.  $y = 4 - |x + 2|$                       12.  $y = 4|x + 2|$   
13.  $y = \frac{1}{3}|3 - 3x|$                       14.  $y = 3|\frac{1}{3} - \frac{1}{3}x|$                       15.  $y = \frac{3}{2}|x| - \frac{5}{2}$   
16.  $y = |x| + \frac{1}{2}|x|$                       17.  $y = \frac{1}{2}|x| - |x|$                       18.  $y = \frac{1}{2}|x - \frac{1}{2}|$

**Example 3**  
(page 87)

Graph each equation by writing two linear equations. 19-28. See back of book.

19.  $y = |x + 6|$                       20.  $y = |3x + 6|$                       21.  $y = |3x - 6|$   
22.  $y = -|x - 5|$                       23.  $y = |2x + 1|$                       24.  $y = \frac{3}{2}|3x - 1|$   
25.  $y = |x - 2| - 6$                       26.  $y = |\frac{1}{2}x - 4| + 4$                       27.  $y = \frac{1}{2}|\frac{1}{2}x + 2|$

**Example 4**  
(page 88)

28. **Manufacturing** The conveyor belt at a factory operates continuously 24 hours a day, carrying vitamin bottles and moving two feet each minute. Sketch a graph showing the distance in feet from the filling arm of one bottle on the conveyor belt before and after it is filled. Use the  $x$ -axis for time before and after the bottle is filled and the  $y$ -axis for distance from the filling arm.

# 3. Practice

## Assignment Guide

### 1 Objective

**A B** Core 1–52

**C** Extension 53–59

Standardized Test Prep 60–66

Mixed Review 67–82

### Error Prevention

**Exercises 10–18, 29–32** Students should be careful to use parentheses in the appropriate places when they enter the function on the Y= list.

**Exercises 53–58** Suggest that students check their graphs by graphing the functions on a graphing calculator.

### Enrichment 2-5

### Reteaching 2-5

### Practice 2-5

#### Practice 2-5

Match each equation with its graph.

1.  $y = |x - 1|$

4.  $y = |x + 1|$

7.  $y = |x - 3|$

10.  $y = |x + 3|$

13.  $y = |3 - x|$

16.  $y = |-x - 2|$

19.  $\frac{1}{2}y = |3x - 1| - 2$

2.  $y = |2x - 1|$

5.  $y = |2x + 1|$

8.  $y = |2x - 5|$

11.  $y = |-3x + 4|$

14.  $y = -\frac{1}{2}|x + 1|$

17.  $3y = |2x - 9|$

20.  $y + 3 = |x + 1|$

3.  $y = |2x + 1|$

6.  $y = |2x - 2|$

9.  $y = 2|x + 2|$

12.  $y = \frac{1}{2}|x + 2| + 1$

15.  $y = 3 - |x + 1|$

18.  $y = -|x + 2|$

21.  $-2y = |2x - 4|$

Algebra 2 Chapter 2

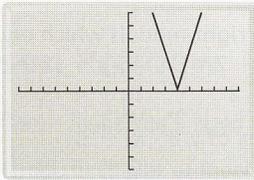
Lesson 2-5 Practice

### Apply Your Skills

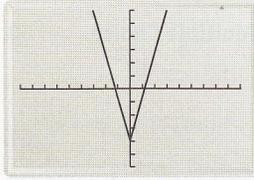
Match each equation with its graph. Each interval is 1 unit.

29.  $y = |3x| - 4$  **B** 30.  $y = |3x - 4|$  **C** 31.  $y = 3|x - 4|$  **A** 32.  $y = |3x + 12|$  **D**

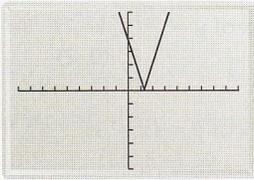
**A.**



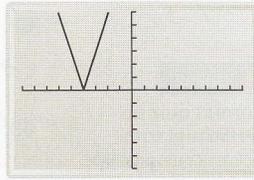
**B.**



**C.**



**D.**



Graph each absolute value equation. 33–50. See back of book.

33.  $y = |4x + 2|$

34.  $y = |-3x + 5|$

35.  $y = |4 - 2x|$

36.  $y = |-\frac{1}{4}x - 1|$

37.  $y = |\frac{5}{2}x - 2|$

38.  $y = |\frac{3}{2}x + 2|$

39.  $y = |3x - 6| + 1$

40.  $y = -|x - 3|$

41.  $y = |2x + 6|$

42.  $y = 2|x + 2| - 3$

43.  $y = 6 - |3x|$

44.  $y = 6 - |3x + 1|$

45.  $y = -|-2x - 1| + 1$

46.  $y = 2|x - 3|$

47.  $y = -\frac{3}{2}|\frac{1}{2}x|$

48.  $2y = \frac{1}{2}|x + 2|$

49.  $\frac{1}{3}y - 3 = -|x + 2|$

50.  $-3y = |3x - 6|$



**51. Travel** The graph at the right models a car traveling at a constant speed.

**a.** Describe the relation shown in the graph.

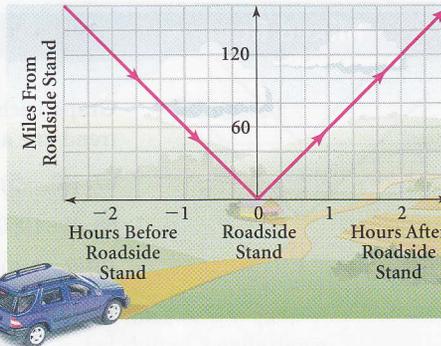
**b.** Which equation best represents the relation? **A**

**A.**  $y = |60x|$

**B.**  $y = |x + 60|$

**C.**  $y = |60 - x|$

**D.**  $y = |x| + 60$



**52. a.** Graph the equations  $y = |\frac{1}{2}x - 6| + 3$  and  $y = -|\frac{1}{2}x + 6| - 3$  on the same set of axes. **a–b.** See back of book.



**b. Writing** Describe the similarities and differences in the graphs.

### Challenge



Graph each absolute value equation. 53–58. See back of book.

53.  $y = |3x| - x|\frac{1}{3}|$

54.  $y = x - |2x|$

55.  $y = |2x| - x$

56.  $y = \frac{1}{2}|x - 3| + 5$

57.  $y = \frac{1}{2}|x| + 4|x - 1|$

58.  $y = |x + 1| + |x|$

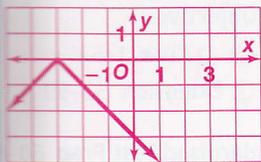
**59. Answers may vary. Samples:**

**59. a. Open-Ended** Find two absolute value equations with graphs that share a vertex.  $y = |x|, y = -|x|$

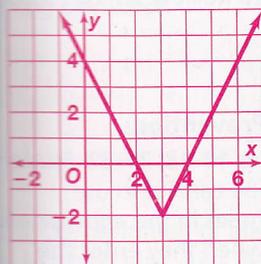
**b.** Find two absolute value equations with graphs that share part of a ray.  $y = |x|, y = |x - 1| + 1$

## Lesson Quiz 2-5

Graph  $y = -|x + 3|$ .



Graph  $y = |2x - 6| - 2$ .



## Alternative Assessment

Students work in pairs. One student writes a function in the form  $y = |mx + b|$  and the other student graphs the function. They trade functions and each graphs the function provided by the partner. The partners verify that the graphs are correctly drawn.

## FCAT Practice

### Resources

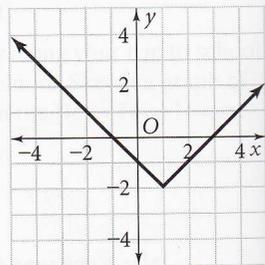
Additional practice with a variety of test item formats:  
 FCAT Practice, p. 111  
 FCAT Strategies, p. 106  
 FCAT Daily Practice and Strategies Transparencies

**Exercise 64** Be careful that, when you use the definition of absolute value, you rewrite the absolute value equation as two linear equations.

## FCAT Practice

### Multiple Choice

60. The graph at the right models which equation? **B**  
 A.  $y = |3x - 1| + 2$       B.  $y = |x - 1| - 2$   
 C.  $y = |x - 1| + 2$       D.  $y = |3x - 3| - 2$
61. What is the vertex of  $y = |x| - 5$ ? **I**  
 F. (5, 0)      G. (-5, 0)  
 H. (0, 5)      I. (0, -5)
62. What is the vertex of  $y = -|x| - 2$ ? **A**  
 A. (0, -2)      B. (0, 2)  
 C. (2, 0)      D. (2, -2)
63. What is the vertex of  $y = |x - 3| + 5$ ? **I**  
 F. (-3, 5)      G. (-3, 11)      H. (0, 5)      I. (3, 5)
64. Which pair of linear equations represents the equation  $y = |x + 3| - 4$ ?  
 A.  $y = x + 1$  for  $x \geq 3$   
     $y = x - 1$  for  $x < 3$   
 B.  $y = x - 1$  for  $x \geq 3$   
     $y = -x - 1$  for  $x < 3$   
 C.  $y = x - 1$  for  $x \geq -3$   
     $y = -x - 7$  for  $x < -3$   
 D.  $y = -x - 1$  for  $x \geq -3$   
     $y = -x + 7$  for  $x < -3$



FCAT Online

FCAT Format quiz at  
[www.PHSchool.com](http://www.PHSchool.com)  
 Web Code: aga-0205

### Short Response

### Extended Response

65. Explain how to find the x-coordinate of the vertex of  $y = |3x - 6|$ .  
**See margin.**
66. How can you graph the equation  $y = -|5x + 1|$  by writing two linear equations? Show both equations, and label the coordinates of the vertex in your graph. **See back of book.**

## Mixed Review

### Lesson 2-4

Graph each set of data. Decide whether a linear model is reasonable. If so, draw a trend line and write its equation. **67-70. See back of book.**

67.  $\{(0, -5), (5, 25), (7, 44), (9, 70), (11, 90)\}$   
 68.  $\{(-10, 0), (-4, 4), (-1, 6), (2, 8), (5, 10)\}$   
 69.  $\{(-5, 6), (-1, 4), (0, 5), (3, 8), (4, 7)\}$   
 70.  $\{(0, 7), (2, 6), (5, 4.5), (6, 4), (9, 2.5)\}$

### Lesson 2-4

Find the slope of each line.

71.  $3x + y = 1$  **-3**      72.  $5y - 20x = 6$  **4**      73.  $y = \frac{-x}{9}$   **$-\frac{1}{9}$**   
 74.  $12x = 3y - 2$  **4**      75.  $\frac{x}{2} + \frac{y}{3} = 1$   **$-\frac{3}{2}$**       76.  $0.1y = 0.5x + 0.1$

77. A tutor earns \$18 per hour. Write a function to model the tutor's earnings after  $h$  hours. What kind of function is this?  **$y = 18h$ ; linear**

### Lesson 1-3

Solve each equation.

78.  $17x = 187$  **11**      79.  $13c - 26 = 91$  **9**      80.  $2(a - 6) + 11 = 25$   
 81.  $7(b + 3) - 18(1 - b) = 103$  **4**      82.  $6(m + 3) = 3(5 - m) + 66$  **7**

### pages 88-90 Exercises

65. [2] The vertex of  $y = |3x - 6|$  would be where  $3x - 6 = -(3x - 6)$  because that would be

where the graphs of both lines meet. In this case it is at  $x = 2$ .

[1] only includes solution  $x = 2$