Name _____ Date _____

LESSON 2.1

Practice

For use with pages 72–79

Identify the domain and range of the given relation. Then tell whether the relation is a function.

1. $(0, 3), (1, 1), (2, 2), (3, 4), (4, 2)$

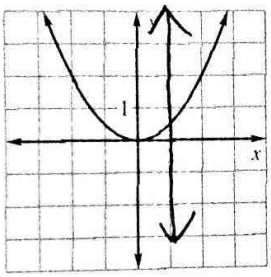
Domain = $\{0, 1, 2, 3, 4\}$
Range = $\{1, 2, 3, 4\}$
Relation is a function

2. $(-2, -3), (-1, -1), (0, 1), (0, 3), (1, 5)$

Domain = $\{-2, -1, 0, 1\}$
Range = $\{-3, -1, 1, 3, 5\}$
Relation is not a function because 0 is paired with 1 and 3.

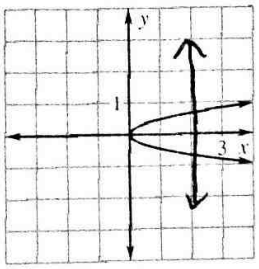
Use the vertical line test to determine whether the relation is a function.

3.



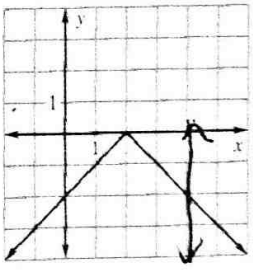
yes

4.



No, a vertical line can cross the graph in 2 points

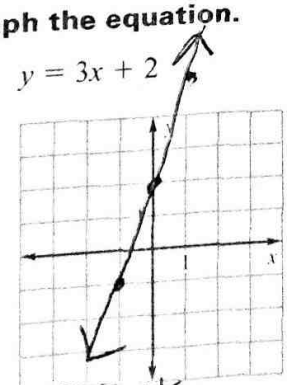
5.



yes

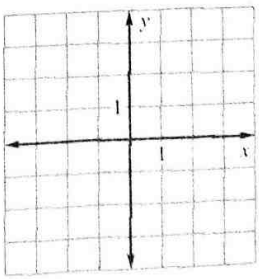
Graph the equation.

6. $y = 3x + 2$

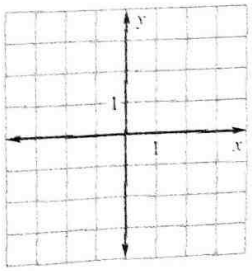


Input Domain x	Output Range y
0	2
1	5
2	8
-1	-1

7. $y = -2x - 2$



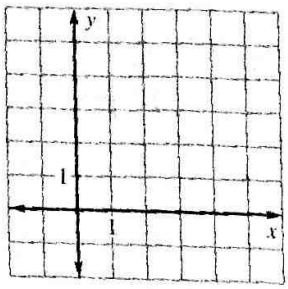
8. $y = -x$



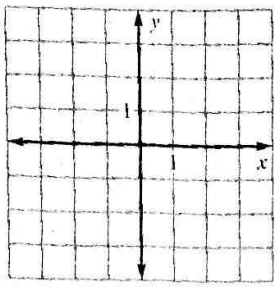
Name _____ Date _____

LESSON 2.1 **Practice** *continued*
For use with pages 72–79

9. $y = -x + 3$

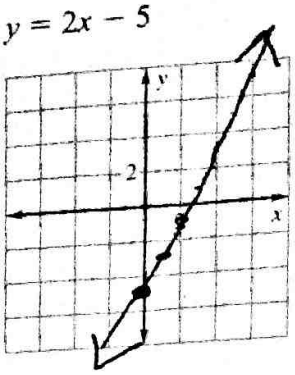


10. $y = \frac{1}{2}x + 2$

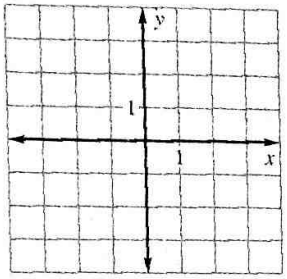


11. $y = 2x - 5$

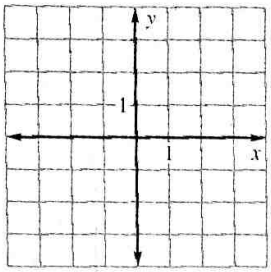
D: x	R: y
0	-5
1	-3
2	-1



12. $y = x + 2$

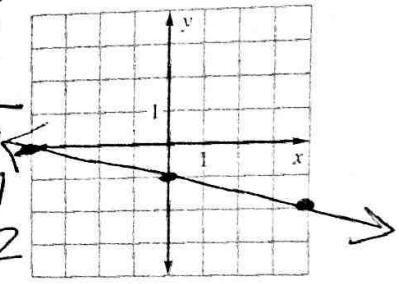


13. $y = -1$



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

D: x	R: y
-4	0
0	-1
4	-2



Tell whether the function is linear. Then evaluate the function for the given value of x.

15. $f(x) = x + 5; f(-2)$

yes

$f(-2) = -2 + 5$

$f(-2) = 3$

16. $f(x) = x^2 + x - 2; f(1)$

Not linear, but yes a function

$f(1) = 1^2 + 1 - 2$

$f(1) = 0$

17. $f(x) = 3 - 3x; f(2)$

yes

$f(2) = 3 - 3(2) = 3 - 6$

$f(2) = -3$

18. $f(x) = |x + 2|; f(-4)$

Not linear, but yes a function

$f(-4) = |-4 + 2|$

$f(-4) = 2$

19. $f(x) = \frac{2}{x - 2}; f(6)$

Not linear, but yes a function

$f(6) = \frac{2}{6 - 2} = \frac{2}{4}$

$f(6) = \frac{1}{2}$

20. $f(x) = \frac{2}{3}x - 5; f(9)$

yes

$f(9) = \frac{2}{3}\left(\frac{9}{1}\right) - 5$

$f(9) = 1$

Name _____ Date _____

LESSON 2.1 **Practice** *continued*
For use with pages 72–79

In Exercises 21–23, use the following information.

PGA Money List The table below shows the top five players on the 2005 PGA Tour money list through June 5th along with the number of wins for each player.

Player	Vijay Singh	Phil Mickelson	Tiger Woods	David Toms	Kenny Perry
Wins, *x*	3	3	3	1	2
Dollars, *y* (in millions)	5.3	4.2	4.1	3.3	2.5

21. What is the domain of the relation?

Domain = {3, 1, 2} or {1, 2, 3}

22. What is the range of the relation?

Range = {5.3, 4.2, 4.1, 3.3, 2.5}

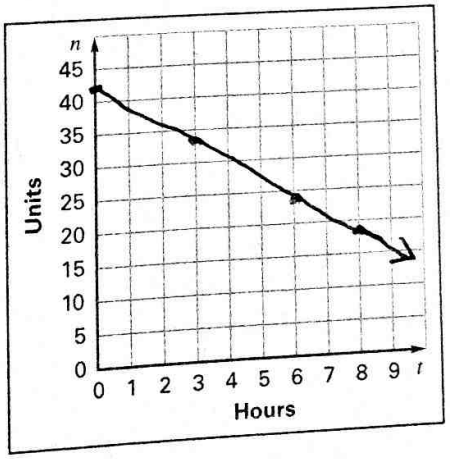
23. Is the amount of money earned a function of the number of wins?

No, there are different money amounts for 3 wins.

In Exercises 24–26, use the following information.

Furniture Assembly At the beginning of your 8 hour shift, there were 42 units of furniture that needed assembled. The number of units n that still need to be assembled during your shift can be modeled by $n(t) = -3t + 42$ where t is the time in hours.

24. Graph the model.



t	$n(t)$
0	42
3	33
5	27
6	24
8	18

25. What is a reasonable domain and range of the model?

A reasonable time would be between 0 and 8 inclusive. $0 \le t \le 8$. (8 hour shift)

A reasonable number of units would be between 18 and 42 inclusive. $18 \le n \le 42$ (42 unit to be assembled)

26. How many units still need to be assembled after you have worked 5 hours of your shift?

$n(5) = -3(5) + 42$

$-15 + 42$

27

Name _____ Date _____

LESSON 2.2

Practice

For use with pages 82–88

Find the slope of the line passing through the given points.

1. (2, 1), (6, 9)

$m = \frac{9-1}{6-2} = \frac{8}{4} = \boxed{2}$

2. (1, 1), (2, −5)

$m = \frac{-5-1}{2-1} = \frac{-6}{1} = \boxed{-6}$

3. (−3, 2), (6, −1)

$m = \frac{-1-2}{6+3} = \frac{-3}{9} = \boxed{\frac{-1}{3}}$

4. (3, −2), (−1, 7)

$\frac{7+2}{-1-3} = \boxed{\frac{9}{-4}}$

5. (0, −5), (−2, −9)

$m = \frac{-9-(-5)}{-2-0} = \frac{-9+5}{-2} = \frac{-4}{-2} = \boxed{2}$

6. $\left(\frac{1}{3}, \frac{1}{2}\right), \left(\frac{5}{3}, \frac{5}{2}\right)$

$\frac{\frac{5}{2}-\frac{1}{2}}{\frac{5}{3}-\frac{1}{3}} = \frac{\frac{4}{2}}{\frac{4}{3}} = \frac{4}{2} \cdot \frac{3}{4} = \boxed{\frac{3}{2}}$

Tell which line is steeper.

7. Line 1: through (−2, 2), (4, 3)

Line 2: through (2, 3), (6, 4)

$m_1 = \frac{3-2}{4-(-2)} = \boxed{\frac{1}{6}}$

$m_2 = \frac{4-3}{6-2} = \boxed{\frac{1}{4}}$

$m_2 > m_1$

$\frac{1}{4} > \frac{1}{6}$, so Line 2 is steeper

8. Line 1: through (5, 2), (7, 12)

Line 2: through (−3, −1), (−2, 5)

$m_1 \quad \frac{12-2}{7-5} = \frac{10}{2} = \boxed{5}$

$m_2 = \frac{5+1}{-2+3} = \frac{6}{1} = \boxed{6}$ Line 2 steeper

9. Line 1: through (1, 1), (3, 0)

Line 2: through (4, 2), (8, −2)

$m_1 = \frac{0-1}{3-1} = \boxed{\frac{-1}{2}}$

$m_2 = \frac{-2-2}{8-4} = \frac{-4}{4} = \boxed{-1}$

$|m_2| > |m_1|$

$|-1| > \left|\frac{-1}{2}\right|$

Line 2 is steeper

10. Line 1: through (3, 8), (6, 17)

Line 2: through (0, 1), (−3, 7)

Line 1 steeper

$m_1 = \frac{17-8}{6-3} = \frac{9}{3} = \boxed{3}$

$m_2 = \frac{1-7}{0-3} = \frac{-6}{-3} = \boxed{2}$

Name _____ Date _____

LESSON 2.2 **Practice** *continued*
For use with pages 82–88

Find the slope of the line passing through the given points. Then tell whether the line *rises*, *falls*, *is horizontal*, or *is vertical*.

11. (−2, 4), (2, 5)

$m = \frac{5-4}{2-(-2)} = \frac{1}{4}$ + slope so rises

12. (3, 1), (3, −2)

$m = \frac{-2-1}{3-3} = \frac{-3}{0}$ undefined vertical

13. (8, 15), (12, −1)

$m = \frac{-1-15}{12-8} = \frac{-16}{4} = -4$, − slope so falls

14. (5, −2), (2, −2)

$\frac{-2+2}{2-5} = \frac{0}{-3} = 0$ horizontal

15. (9, −3), (−6, 4)

$m = \frac{4-(-3)}{-6-9} = \frac{7}{-15}$, − slope so falls

16. (4, 5), (21, 5)

$\frac{5-5}{21-4} = \frac{0}{17} = 0$ horizontal

Tell whether the lines are *parallel*, *perpendicular*, or *neither*.

17. Line 1: through (−6, 2), (3, 5)

Line 2: through (4, 1), (1, 0) $m_1 = m_2$ so parallel

$m_1 = \frac{5-2}{3-(-6)} = \frac{3}{9} = \frac{1}{3}$

$m_2 = \frac{0-1}{1-4} = \frac{-1}{-3} = \frac{1}{3}$

18. Line 1: through (7, 3), (8, 7)

Line 2: through (−5, −4), (−1, −5) $m_1(m_2) = -1$

$m_1 = \frac{7-3}{8-7} = \frac{4}{1} = 4$ $4\left(\frac{-1}{4}\right) = -1$

$m_2 = \frac{-5+4}{-1+5} = \frac{-1}{4}$ perpendicular

19. Line 1: through (5, 2), (1, −7)

Line 2: through (−1, 3), (9, −1)

$m_1 = \frac{-7-2}{1-5} = \frac{-9}{-4} = \frac{9}{4}$ neither

$m_2 = \frac{-1-3}{9-(-1)} = \frac{-4}{10} = \frac{-2}{5}$

20. Line 1: through (5, 9), (7, 13)

Line 2: through (0, 2), (4, 10)

$m_1 = \frac{13-9}{7-5} = \frac{4}{2} = 2$ parallel

$m_2 = \frac{10-2}{4-0} = \frac{8}{2} = 2$

21. Fuel Efficiency On Friday, you left for a weekend camping trip with 110 miles on the odometer and 14.5 gallons of gas in the tank of your car. When you returned on Sunday, the odometer read 299 miles and you still had 7.5 gallons of gas left. What was the fuel efficiency of your car on this trip?

(g, m) (14.5, 110) (7.5, 299)

$\frac{299-110}{14.5-7.5} = \frac{189}{7} = 27$ mi/g

22. Production Rate When you started your shift at 7:00 A.M., 120 steel valves had already been machined and were ready for assembly. At 3:00 P.M., your shift ended and 424 steel valves were now completed and ready for assembly. The target production rate is 36 steel valves per hour. What was the production rate for your shift? Would your supervisor be satisfied with the work pace? yes

(t, v) (0, 120) (8, 424)

rate = slope $\frac{424-120}{8-0} = \frac{304}{8} = 38$ valves/hr

38
8 | 304
24
64

Name _____ Date _____

LESSON 2.3

Practice

For use with pages 89–97

$y = mx + b$

Find the slope and *y*-intercept of the line.

1. $y = 7x + 8$

$m = 7$

$b = 8$

2. $y = -13x + 0$

$y = mx + b$

$m = -13 \quad b = 0$

3. $2x + y - 2 = 0$

$y = -2x + 2$

$m = -2 \quad b = 2$

4. $4x + 2y - 5 = 0$

$\frac{2y}{2} = \frac{-4x + 5}{2}$

$y = -2x + \frac{5}{2}$

$m = -2 \quad b = \frac{5}{2}$

5. $5x - y + 2 = 0$

$-y = -5x - 2$

$\frac{-y}{-1} = \frac{-5x - 2}{-1}$

$y = 5x + 2$

$m = 5 \quad b = 2$

6. $-3x + 2y - 4 = 0$

$\frac{2y}{2} = \frac{3x + 4}{2}$

$y = \frac{3}{2}x + 2$

$m = \frac{3}{2} \quad b = 2$

Find the *x*- and *y*-intercepts of the line with the given equation.

7. $y = 4x - 1$

$0 = 4x - 1$

$\frac{1}{4} = \frac{4x}{4}$

x-int $(\frac{1}{4}, 0)$

y-int $(0, -1)$

8. $y = -x - 4$

$0 = -x - 4$

$x = -4$

x-int $(-4, 0)$

y-int $(0, -4)$

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

$0 = -\frac{1}{2}x + 2$

$-2(-2) = (-\frac{1}{2}x)(-2)$

x-int $(4, 0)$

y-int $(0, 2)$

replace $y = 0$ aside for x

10. $y = \frac{3}{2}x + 1$

$0 = \frac{3}{2}x + 1$

$\frac{3}{2}(-1) = \frac{3}{2}x(\frac{2}{3})$

x-int $(-\frac{2}{3}, 0)$

y-int $(0, 1)$

11. $y = \frac{4}{3}x - 2$

$0 = \frac{4}{3}x - 2$

$\frac{3}{4}(2) = \frac{4}{3}x(\frac{3}{4})$

$\frac{6}{4} = \frac{3}{2}$

x-int $(\frac{3}{2}, 0)$

y-int $(0, -2)$

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

$0 = -\frac{1}{3}x - 3$

$-3(3) = (-\frac{1}{3}x)(-3)$

x-int $(-9, 0)$

y-int $(0, -3)$

13. $x - y - 3 = 0$

$x - 3 = 0$

$x = 3$

x-int $(3, 0)$

$-y - 3 = 0$

$-3 = y$

y-int $(0, -3)$

14. $2x - 3y + 6 = 0$

$2x + 6 = 0$

$x = -3$

x-int $(-3, 0)$

$-3y + 6 = 0$

y-int $(0, 2)$

15. $-7x - 14y - 5 = 0$

$-7x - 5 = 0$

$-7x = 5$

$x = -\frac{5}{7}$

x-int $(-\frac{5}{7}, 0)$

$-14y - 5 = 0$

$-14y = 5$

$y = \frac{5}{-14}$

y-int $(0, -\frac{5}{14})$

16. $4x - 2y = 1$

$4x = 1$

$\frac{4x}{4} = \frac{1}{4}$

x-int $(\frac{1}{4}, 0)$

$-2y = 1$

$\frac{-2y}{-2} = \frac{1}{-2}$

$y = -\frac{1}{2}$

y-int $(0, -\frac{1}{2})$

17. $6x + 4y = -5$

$6x = -5$

$\frac{6x}{6} = \frac{-5}{6}$

$x = -\frac{5}{6}$

x-int $(-\frac{5}{6}, 0)$

$4y = -5$

$\frac{4y}{4} = \frac{-5}{4}$

$y = -\frac{5}{4}$

y-int $(0, -\frac{5}{4})$

18. $-3x + y = -8$

$-3x = -8$

$\frac{-3x}{-3} = \frac{-8}{-3}$

$x = \frac{8}{3}$

x-int $(\frac{8}{3}, 0)$

y-int $(0, -8)$

Name _____ Date _____

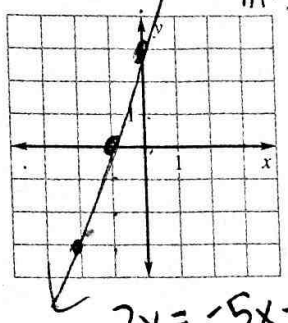
LESSON 2.3

Practice *continued*

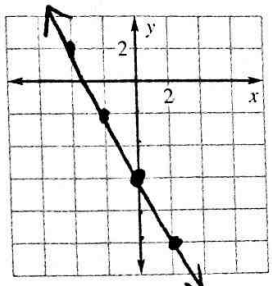
For use with pages 89–97

Graph the equation.

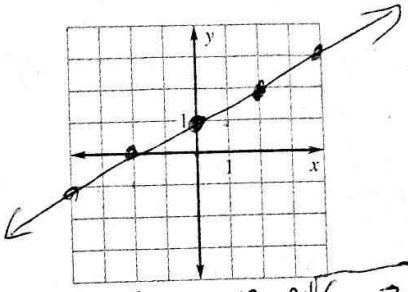
19. $y = 3x + 3$



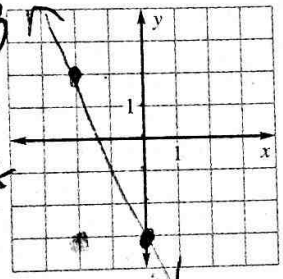
20. $y = -2x - 6$



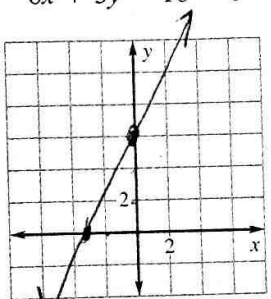
21. $x - 2y + 2 = 0$



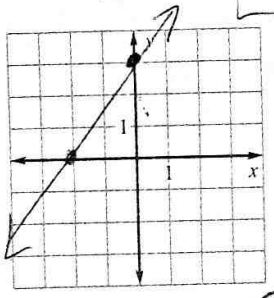
22. $5x + 2y + 6 = 0$



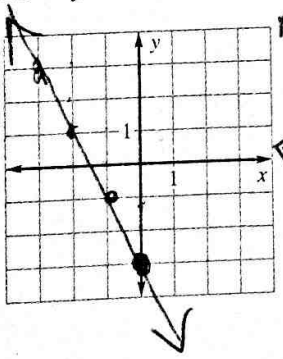
23. $-6x + 3y - 18 = 0$



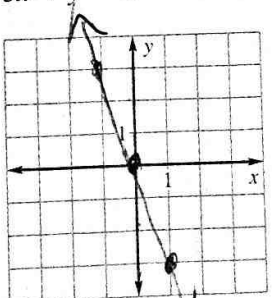
24. $12x - 8y = -24$



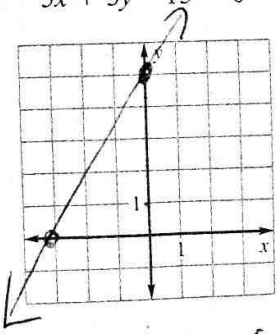
25. $2x + y = -3$



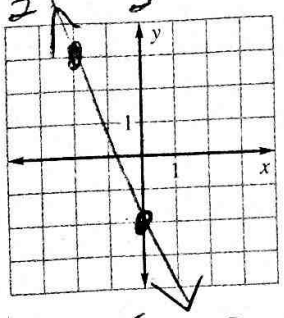
26. $3x + y = 0$



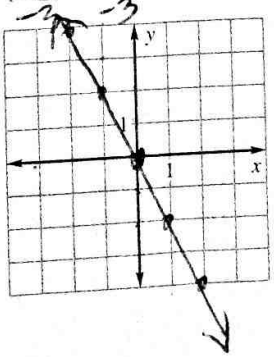
27. $-5x + 3y - 15 = 0$



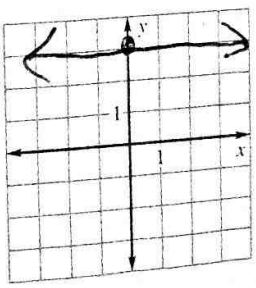
28. $2y = -5x - 4$



29. $-3y = 6x$



30. $6y - 18 = 0$



Name _____ Date _____

LESSON 2.3 **Practice** *continued*
For use with pages 89–97

31. Hot Dogs and Hamburgers The caterer for your class picnic charges \$1 for each hot dog and \$2 for each hamburger. You have \$48 to spend. Write a model that shows the different numbers of hot dogs and hamburgers that you could purchase.

$1x + 2y = 48$

32. Commission A car salesperson earns 2% on used car sales and 6% on new car sales. The salesperson wants to earn a \$7000 commission this month. Write a model that shows the different sales amounts of used and new cars that can be sold to reach the target commission.

$.02x + .06y = 7000$

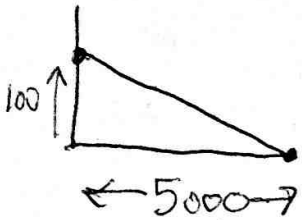
In Exercises 33–35, use the following information.

Airplane Landing An airplane's altitude is 100 feet as it is descending for a landing on a runway whose touchdown point is 5000 feet away. Let the x-axis represent the distance on the ground and the y-axis represent the airplane's altitude.

33. What is the slope of the airplane's descent?

$\frac{-100}{5000} = \frac{-1}{50}$

down 1 ft for every 50 ft



34. What is the y-intercept of the airplane's descent?

(0, 100) 100 ft Beginning altitude

35. Write an equation of the line that follows the path of the airplane's descent.

$y = \frac{-1}{50}x + 100$

$y = mx + b$

Name _____ Date _____

LESSON 2.4

Practice

For use with pages 98–104

$y = mx + b$

Write an equation of the line that has the given slope and y-intercept.

1. $m = 3, b = -4$

$y = 3x - 4$

2. $m = -4, b = 0$

$y = -4x + 0$

3. $m = 0, b = -5$

$y = 0x - 5$

$y = -5$

$y - y_1 = m(x - x_1)$

Write an equation of the line that passes through the given point and has the given slope.

4. $(4, 3), m = 1$

$y - 3 = 1(x - 4)$

$+3 \quad +3$

$y = x - 1$

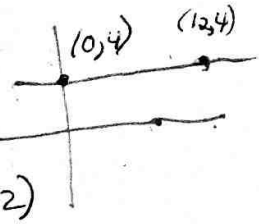
5. $(-1, 1), m = -2$

$y - 1 = -2(x + 1)$

$y - 1 = -2x - 2$

$y = -2x - 1$

6. $(12, 4), m = 0$ horizontal



$y = 4$

$y - 4 = 0(x - 12)$

$y - 4 = 0x$

7. $\left(\frac{2}{3}, 1\right), m = -3$

$y - 1 = -3\left(x - \frac{2}{3}\right)$

$y - 1 = -3x + 2$

$y = -3x + 3$

8. $\left(-2, \frac{1}{2}\right), m = 8$

$y - \frac{1}{2} = 8(x + 2)$

$+\frac{1}{2} \quad 8x + 16 \quad +\frac{1}{2}$

$y = 8x + 16.5$ or $y = 8x + \frac{33}{2}$

9. $\left(\frac{3}{5}, 0\right), m = -5$

$y - 0 = -5\left(x - \frac{3}{5}\right)$

$y = -5x + 3$

Write an equation of the line that passes through the given point and satisfies the given condition.

10. $(-2, 3)$; parallel to $y = 4x - 3$

$\parallel m = 4$

$y - 3 = 4(x + 2)$

$+3 \quad 4x + 8 \quad +3$

$y = 4x + 11$

11. $(3, 7)$; parallel to $y = -3x + 6$

$\parallel m = -3$

$y - 7 = -3(x - 3)$

$-3x + 9$

$y = -3x + 16$

12. $(-1, -4)$; perpendicular to $y = 2x + 5$

$\perp m = -\frac{1}{2}$

$y + 4 = -\frac{1}{2}(x + 1)$

$-4 \quad -\frac{1}{2}x - \frac{1}{2} \quad -4$

$y = -\frac{1}{2}x - 4.5$

$y = -.5x - 4.5$

$y = -\frac{1}{2}x - \frac{9}{2}$

13. $(6, -2)$; perpendicular to $y = -5x - 7$

$\perp m = \frac{1}{5}$

$y + 2 = \frac{1}{5}(x - 6)$

$y + 2 = \frac{1}{5}x - \frac{6}{5}$

$-\frac{10}{5} \quad -\frac{10}{5}$

$y = \frac{1}{5}x - \frac{16}{5}$

Name _____ Date _____

LESSON 2.4 **Practice** *continued* 1st find slope
For use with pages 98–104

Write an equation of the line that passes through the given points.

14. (3, 4), (0, 3) $y=\frac{1}{3}x+3$

$m=\frac{y_2-y_1}{x_2-x_1}=\frac{3-4}{0-3}=\frac{-1}{-3}=\frac{1}{3}$

15. (−3, −3), (2, 1) $y-1=\frac{4}{5}(x-2)$

$m=\frac{1-(-3)}{2-(-3)}=\frac{4}{5}$ $y=\frac{4}{5}x-\frac{8}{5}+\frac{5}{5}$

$y=\frac{4}{5}x-\frac{3}{5}$

16. (−5, −4), (0, 11) $y=3x+11$

$m=\frac{11+4}{0+5}=\frac{15}{5}=3$

17. (1, −4), (−2, 6) $y+4=\frac{-10}{3}(x-1)$

$m=\frac{6-(-4)}{-2-1}=\frac{10}{-3}$ $y+4=\frac{-10}{3}x+\frac{10}{3}$

$-\frac{12}{3}$ $-\frac{12}{3}$

$y=\frac{-10}{3}x-\frac{2}{3}$

18. (2, 8), (5, 2) $y-2=-2(x-5)$

$+2$ $-2x+10$ $+2$

$m=\frac{-6}{3}=-2$ $y=-2x+12$

19. (−8, −3), (7, 0)

$m=\frac{0+3}{7+8}=\frac{3}{15}=\frac{1}{5}$

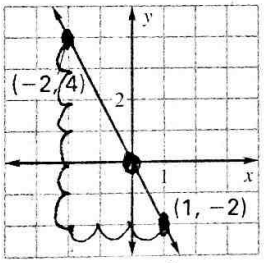
$y-0=\frac{1}{5}(x-7)$

$y=\frac{1}{5}x-\frac{7}{5}$

$y=1$ $y=\frac{1}{2}x-1$

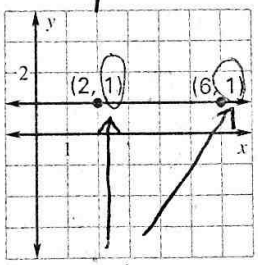
Write an equation of the line.

20.



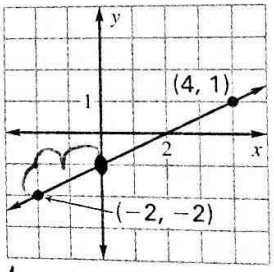
$y=-2x$

21.



$y=1$

22.



$m=\frac{1}{2}$ $b=-1$

23. Video Store The membership to your local video store is $10 per year and the DVD rental rate is $3.95 per DVD. Write an equation that models the total amount of money you will spend on DVD rentals this year.

$y=3.95x+10$ $y=mx+b$ (t, p)

t	p
0	.13
30	.37

$t=0$

2005 − 1975 = 30

In Exercises 24 and 25, use the following information.

Postal Rates The price for U.S. postage stamps has increased over the years. Since 1975, the price has increased from $.13 to $.37 in 2005 at a rate that is approximately linear.

$t=30$ $(0, .13)$ $(30, .37)$

24. Write a linear model for the price of stamps during this time period. Let p represent the price and t represent the number of years since 1975.

$m=\frac{.37-.13}{30-0}=\frac{.24}{30}=.008$

$p=.008t+.13$

25. What would you expect the price of a stamp to be in 2015?

$t=2015-1975=40$ years

$p(40)=.008(40)+.13$

$p(40)=\$.45$

Name _____ Date _____

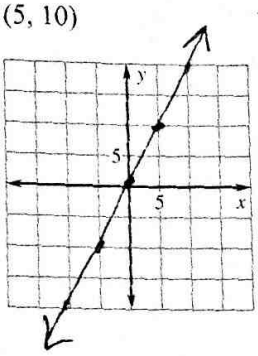
LESSON 2.5

Practice

For use with pages 107–111

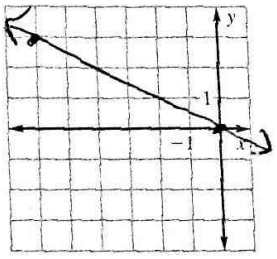
Write and graph a direct variation equation that has the given ordered pair as a solution.

1. (5, 10)



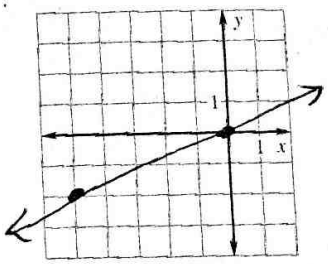
$y = 2x$

2. (−6, 3)



$y = -\frac{1}{2}x$

3. (−5, −2)



$y = \frac{2}{5}x$

The variables *x* and *y* vary directly. Write an equation that relates *x* and *y*. Then find *y* when *x* = 3.

4. $x = 6, y = -8$

$\frac{-8}{6} = \frac{k(6)}{6}$

$y = -\frac{4}{3}x$

$y = -\frac{4}{3}(3) = -4$

5. $x = -4, y = -16$

$-16 = k(-4)$

$4 = k$

$y = 4x$

$y = 4(3) = 12$

6. $x = 2, y = 14$

$\frac{14}{2} = \frac{k(2)}{2}$

$k = 7$

$y = 7x$

$y = 7(3)$

$y = 21$

7. $x = -4, y = -20$

$k = \frac{-20}{-4} = 5$

$y = 5x$

$y = 5(3) = 15$

8. $x = 12, y = -4$

$k = \frac{-4}{12} = -\frac{1}{3}$

$y = -\frac{1}{3}x$

$y = -\frac{1}{3}(3) = -1$

9. $x = 7, y = 4$

$k = \frac{4}{7}$

$y = \frac{4}{7}x$

$y = \frac{4}{7}(3) = \frac{12}{7}$

10. $x = -6, y = -1$

$k = \frac{-1}{-6} = \frac{1}{6}$

$y = \frac{1}{6}x$

$y = \frac{1}{6}(3) = \frac{1}{2}$

11. $x = -10, y = -15$

$k = \frac{-15}{-10} = \frac{3}{2}$

$y = \frac{3}{2}x$

$y = \frac{3}{2}(3) = \frac{9}{2}$

12. $x = 10, y = 4$

$k = \frac{4}{10} = \frac{2}{5}$

$y = \frac{2}{5}x$

$y = \frac{2}{5}(3) = \frac{6}{5}$

Name _____ Date _____

LESSON 2.5

Practice *continued*

For use with pages 107–111

Tell whether the equation represents direct variation. If it does, give the constant of variation.

13. $y = -3x$

yes, $k = -3$

14. $y + 2 = 8x$

No $\quad y = 8x - 2$

15. $2y - 6 = 0$

$2y = 6$

$y = \frac{1}{3}$

No

16. $6x + y = 2$

$y = -6x + 2$

No

17. $-6x + 4y = 0$

$\frac{4y}{4} = \frac{6x}{4}$

$y = \frac{3}{2}x$

yes, $\frac{3}{2}$

18. $\frac{3y}{3} = \frac{9}{2}x \cdot \frac{1}{3}$

$y = \frac{3}{2}x$

yes, $\frac{3}{2}$

Tell whether the data in the table show a direct variation. If so, write an equation relating *x* and *y*.

19.

x	−2	−1	0	1	2
y	4	3	2	1	0

$\frac{4}{-2}$ $\frac{3}{-1}$ $\frac{2}{0}$ $\frac{1}{1}$ $\frac{0}{2}$

No

20.

x	−3	−1	1	3	5
y	−2	$-\frac{2}{3}$	$\frac{2}{3}$	2	$\frac{10}{3}$

$m = \frac{-2}{-3}$ $\frac{-\frac{2}{3}}{-1}$ $\frac{\frac{2}{3}}{1}$ $\frac{2}{3}$ $\frac{\frac{10}{3}}{5}$

Yes, $y = \frac{2}{3}x$

21. Reading The number of pages p a student can read varies directly with the amount of time t in minutes spent reading. The student can read 90 pages in 60 minutes. Write an equation that relates p and t. Predict the number of pages the student can read if 90 minutes is spent reading.

$p = kt$

$90 = k(60)$

$k = \frac{90}{60} = \frac{3}{2}$

$p = \frac{3}{2}t$

$p = \frac{3}{2}\left(\frac{90}{1}\right)$

$= 3(45)$

135 pages

22. Movies The cost c of going to the movies varies directly with the number n of people attending. A group of four paid \$14 to go to the movies on Friday. Write an equation that relates c and n. How much would it cost for 7 people to go to the movies?

$c = kn$

$14 = k(4)$

$k = \frac{7}{2}$

$c = \frac{7}{2}n$

$c = \frac{7}{2}(7) = \frac{49}{2} =$ \$24.50

24.5

2 | 49.0

4

9

8

10

Name _____ Date _____

LESSON 2.6

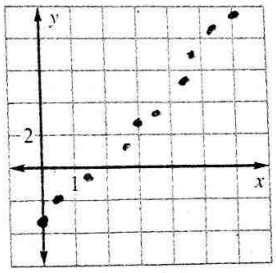
Practice

For use with pages 112–120

Draw a scatter plot of the data. Tell whether the data have a *positive correlation*, a *negative correlation*, or *approximately no correlation*.

1.

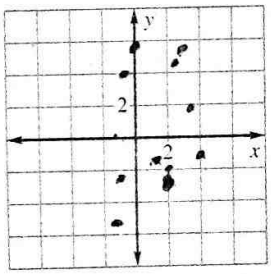
x	0	0.5	1.25	2.75	3
y	−3.5	−2	−0.75	1.25	2.5
x	3.5	4.25	4.75	5.25	6
y	3.25	5.5	7	8.25	9.5



positive correlation

2.

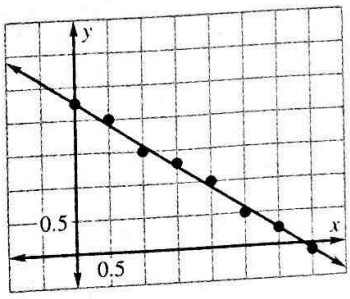
x	−1.5	−1	−0.75	0	1.5
y	−5.25	−2.5	4	5.75	−1.75
x	2	2.25	3	3.5	4
y	−3	4.25	5.5	1.75	−1.25



No correlation

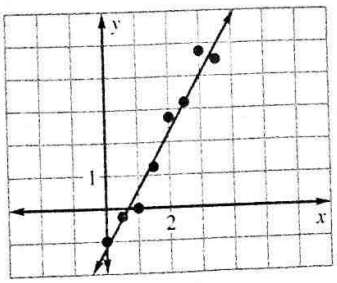
Approximate the best-fitting line for the data.

3.



$y = -\frac{2}{3}x + \frac{9}{4}$

4.



$y = \frac{7}{4}x - \frac{6}{5}$

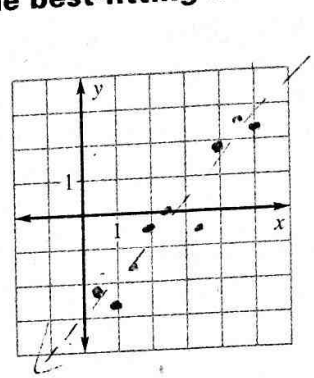
Name _____ Date _____

LESSON 2.6 **Practice** *continued*
For use with pages 112–120

Draw a scatter plot of the data. Approximate the best-fitting line for the data.

5.

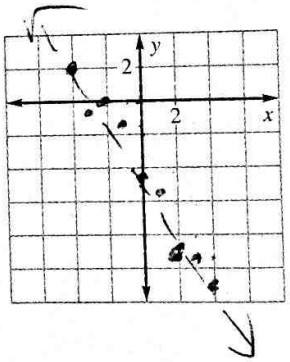
x	0.5	1	1.5	2	2.5
y	−2.25	−2.75	−1.7	−0.5	0
x	3	3.5	4	4.5	5
y	−0.6	1.2	1.9	2.5	2.3



$y = 1.2x - 3.33$

6.

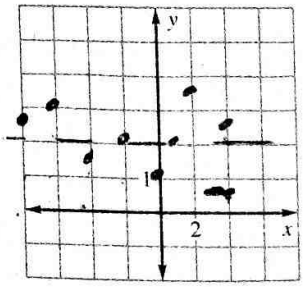
x	−4	−3	−2	−1	0
y	2	−0.5	0	−1.5	−4.2
x	1	2	3	4	
y	−5.8	−8.8	−9.5	−11.4	



$y = -1.8x - 4.5$

7.

x	−4	−3	−2	−1	0
y	2.5	3	1.5	2	1
x	1	2	3	4	
y	2	3.5	0.5	2.5	



$y = 2$

Name _____ Date _____

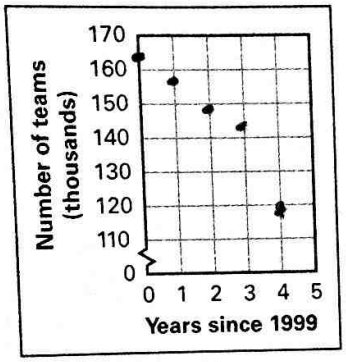
LESSON 2.6 **Practice** *continued*
For use with pages 112–120

In Exercises 8–10, use the following information.

Softball The table shows the number of adult softball teams for the years 1999 to 2003.

	0	1	2	3	4
Year	1999	2000	2001	2002	2003
Number of teams (in thousands)	163	155	149	143	119

8. Draw a scatter plot for the data. Let t represent the number of years since 1999.



9. Using a graphing calculator, approximate the best-fitting line for the data.

Use STAT EDIT L1, L2 2nd STAT PLOT on
Window Xmin=0
Xmax=50
Xscl=1
Ymin=0
Ymax=170
Yscl=10
STAT CALC 4) LinReg
$y=-10x+165.8$

10. Using this model, predict the number of adult softball teams in 2010.

2010
−1999
11 yrs

$y=-10(11)+165.8$
$-110+165.8$
55.8 thous

Name _____ Date _____

LESSON 2.7

Practice

For use with pages 121–129

$y = a|x - h| + k$

$a > 0 \uparrow$ $a < 0 \downarrow$

(h,k)

For the function (a) tell whether the graph *opens up* or *down*, (b) identify the vertex, and (c) tell whether the function is *wider*, *narrower*, or the *same width* as the graph of $y = |x|$.

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

a) opens ↓
b) V(−1, 0)
c) the same

2. $f(x) = 7|x - 3| - 4$

a) opens up
b) V(3, −4)
c) narrower

3. $y = -4|x + 2| + 2$

a) ↓
b) (−2, 2)
c) narrower

4. $f(x) = 2|x + 2| + 8$

a) ↑
b) (−2, 8)
c) narrower

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

a) ↓
b) (−1, 0)
c) wider

6. $f(x) = -|x| - 5$

a) ↓
b) (0, −5)
c) same

7. $y = \frac{5}{2}|x + 9| - 1$

a) ↑
b) (−9, −1)
c) narrower

8. $f(x) = \frac{7}{8}|x + 3| - 9$

a) ↑
b) (−3, −9)
c) wider

9. $y = -\frac{7}{5}|x - 1| + 1$

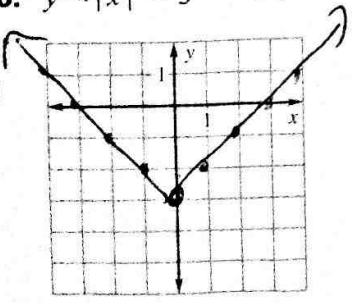
a) ↓
b) (1, 1)
c) narrower

Graph the function.

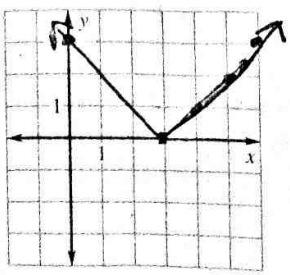
→3 ←2 ↑1

10. $y = |x| - 3$ ↓3

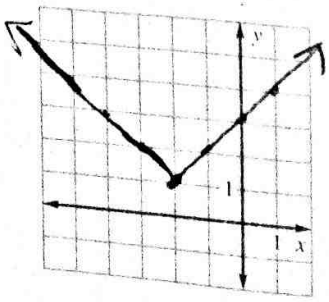
V(0, −3)



11. $f(x) = |x - 3|$



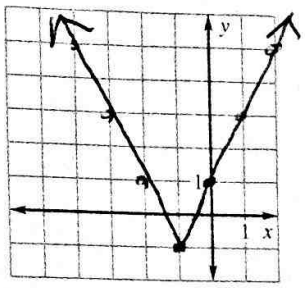
12. $y = |x + 2| + 1$



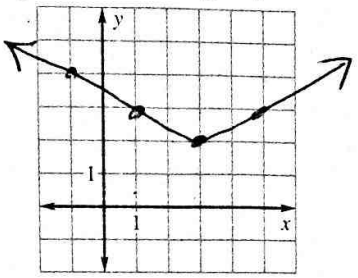
Name _____ Date _____

LESSON 2.7 **Practice** *continued*
For use with pages 121–129

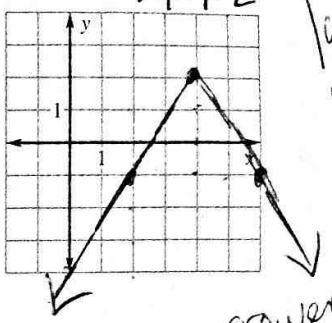
13. $y = 2|x + 1| - 1$
stretch ←1 ↓1



14. $f(x) = \frac{1}{2}|x - 3| + 2$
shrink →3 ↑2



15. $y = -\frac{3}{2}|x - 4| + 2$
→4 ↑2



narrower

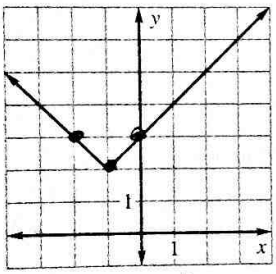
V(4,2) |a|>1 narrower

|a|<1 wider

V(2,3) $y = -2|x - 2| + 3$

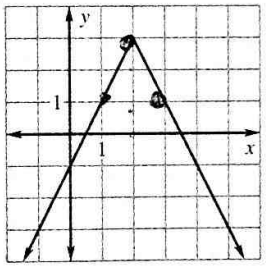
Write an equation of the graph shown.

16.



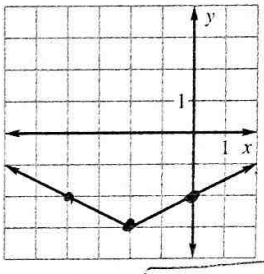
a=1 (-1,2)
h=-1 h k
k=2 y = 1 |x+1| +2

17.



a=-2
(h,k)
(2,3)

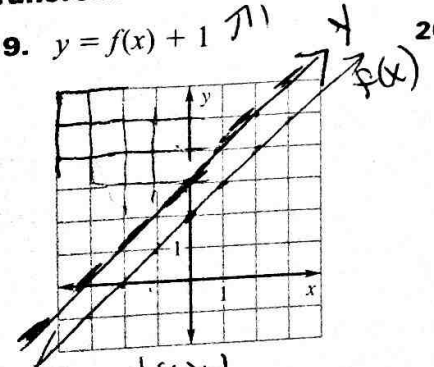
18.



$a = \frac{1}{2}$
(h,k)
(-2,-3)
$y = \frac{1}{2}|x + 2| - 3$

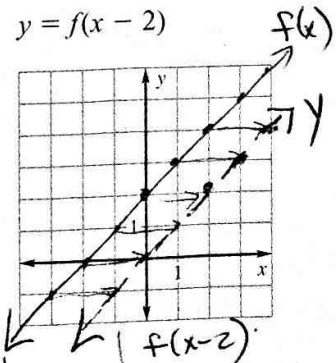
Let $f(x) = x + 2$. Sketch $f(x)$ and then sketch the function y given by the transformation to $f(x)$.

19. $y = f(x) + 1$ ↑1



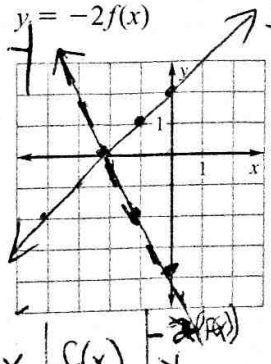
x	f(x)	f(x)+1 = y
-2	0	1
-1	1	2
0	2	3

20. $y = f(x - 2)$ →2



x	f(x)	f(x-2) = y
-2	0	f(-2-2)=f(-4)=-2
-1	1	-1
0	2	0

21. $y = -2f(x)$



x	f(x)	-2f(x) = y
2	0	0
-1	1	-2
0	2	-4

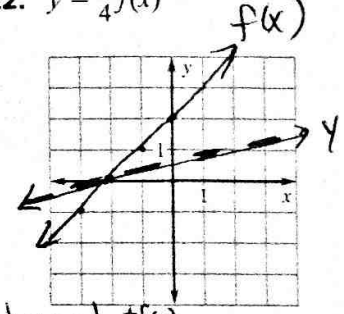
Name _____ Date _____

LESSON 2.7 **Practice** *continued* $y = x + 2$

For use with pages 121–129

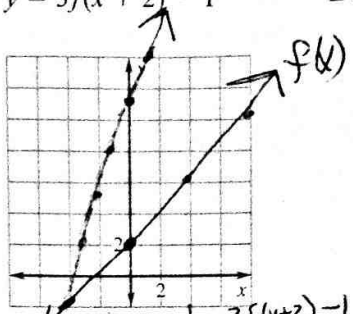
shrink

22. $y = \frac{1}{4}f(x)$



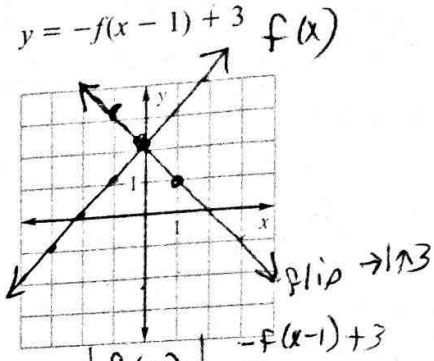
x	f(x)	$\frac{1}{4}f(x)$
-2	0	0
-1	1	$\frac{1}{4}$
0	2	$\frac{1}{2}$

23. $y = 3f(x + 2) - 1$



x	f(x)	$3f(x+2)-1$
-2	0	5
-1	1	8
0	2	11

24. $y = -f(x - 1) + 3$



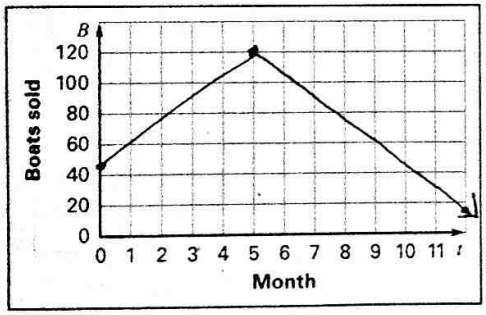
$-f(x-1)+3$

x	f(x)	y
-2	0	4
-1	1	3
0	2	2

In Exercises 25–27, use the following information.

Speedboats The number of boats B a boat dealer sells in each month of the year can be modeled by the function $B = -15|t - 5| + 120$ where t is the time in months and $t = 1$ represents January.

25. Graph the function for $0 \le t \le 12$. 12 months



t	B
0	45
5	120
12	15

$-75+120$

$-105+120$

(5, 120)

26. What is the maximum number of sales in one month? In what month is the maximum reached?

The maximum sold is 120 in month 5.

(12, 15)

27. What is the minimum number of sales in one month? In what month is the minimum reached?

The minimum sold is 15 in month 12.

Copyright © by McDougal Littell, a division of Houghton Mifflin Company.