

Chapter 4 - Writing Linear Functions

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

1. slope: -3

y -intercept: -6

a. $y = -6x + 3$

c. $y = -6x - 3$

b. $y = -3m + 6$

d. $y = -3x - 6$

ANS: D

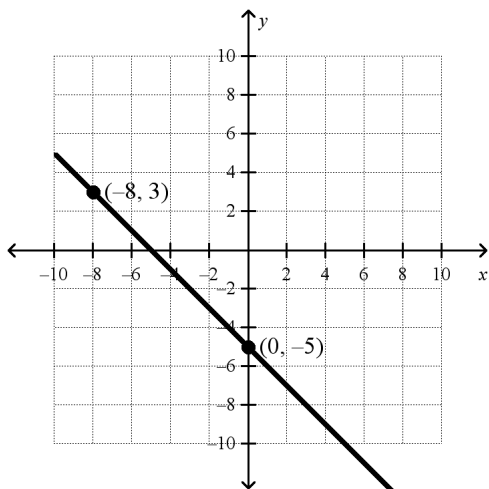
REF: Algebra 1 Sec. 4.1

KEY: writing equations | slope | y -intercept | equation

NOT: Example 1

Write an equation of the line in slope-intercept form.

2.



a. $y = x - 5$

c. $y = -x + 5$

b. $y = -x - 5$

d. $y = x + 5$

ANS: B

REF: Algebra 1 Sec. 4.1

KEY: writing equations | linear equation in two variables | slope-intercept form | equation

NOT: Example 2

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

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

a. $y = -5$

c. $y = -1$

b. $y = \frac{2}{5}x + 1$

d. $y = \frac{5}{2}x + \frac{23}{2}$

ANS: C

REF: Algebra 1 Sec. 4.1

KEY: writing equations | linear equation in two variables | equation

NOT: Example 3

9. Write an equation of the line that passes through the given point and is perpendicular to the given line.

$(-6, -4); y = \frac{1}{3}x + 1$

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

c. $y = -3x + 14$

b. $y = \frac{1}{3}x - 22$

d. $y = -3x - 22$

ANS: D

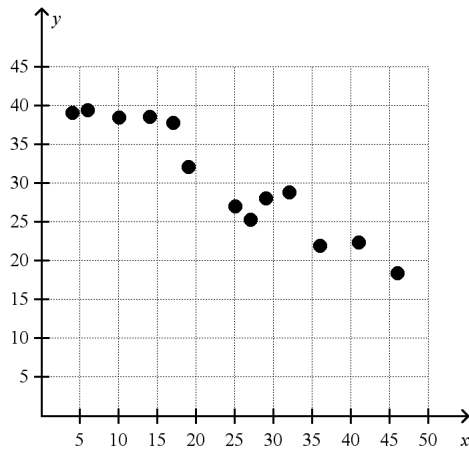
REF: Algebra 1 Sec. 4.3

KEY: perpendicular lines | writing equations | writing equations of perpendicular lines | equation

NOT: Example 4

Tell whether x and y show a *positive*, a *negative*, or *no* correlation.

10.



- a. positive
b. negative
c. no

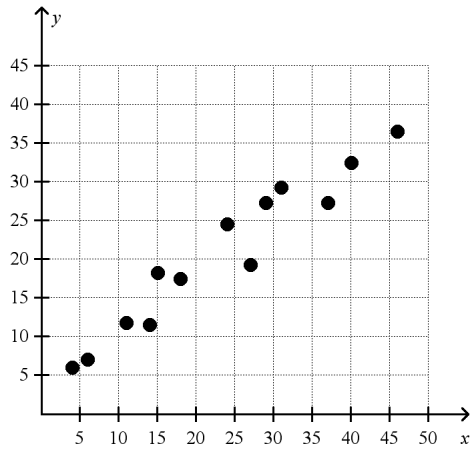
ANS: B

REF: Algebra 1 Sec. 4.4

KEY: scatter plot | correlation | identifying correlations

NOT: Example 2

11.



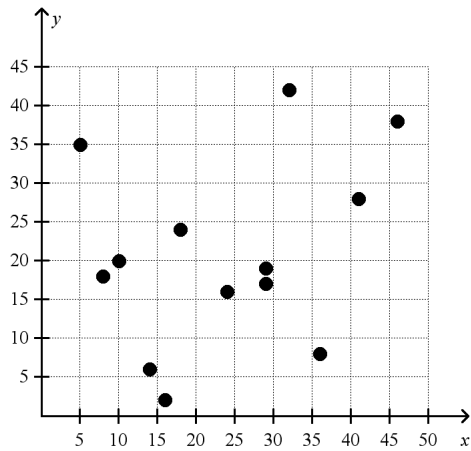
- a. no
- b. positive
- c. negative

ANS: B REF: Algebra 1 Sec. 4.4

KEY: scatter plot | correlation | identifying correlations

NOT: Example 2

12.



- a. no
- b. positive
- c. negative

ANS: A REF: Algebra 1 Sec. 4.4

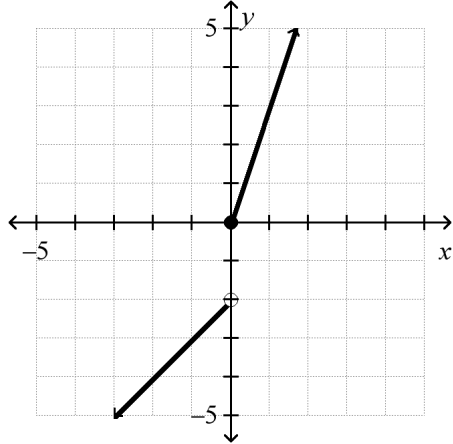
KEY: scatter plot | correlation | identifying correlations

NOT: Example 2

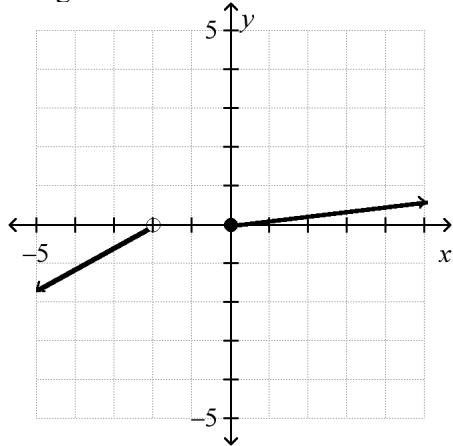
Graph the function. Describe the domain and range.

$$16. y = \begin{cases} x-2, & \text{if } x < 0 \\ 3x, & \text{if } x \geq 0 \end{cases}$$

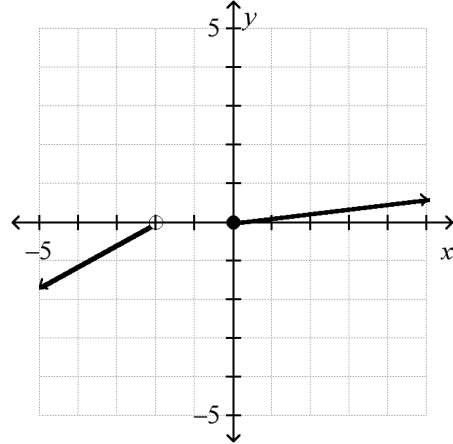
- a. Domain: $x < -2, x \geq 0$
Range: all real numbers



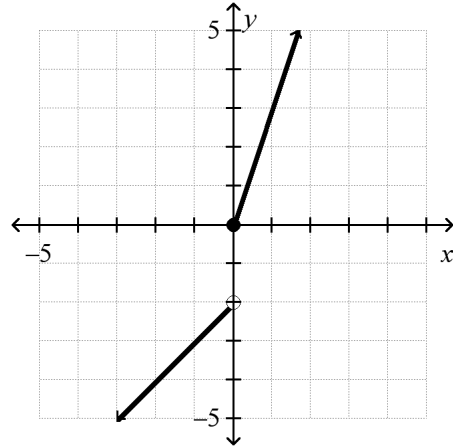
- b. Domain: $x < -2, x \geq 0$
Range: all real numbers



- c. Domain: all real numbers
Range: $y < -2, y \geq 0$



- d. Domain: all real numbers
Range: $y < -2, y \geq 0$



ANS: D

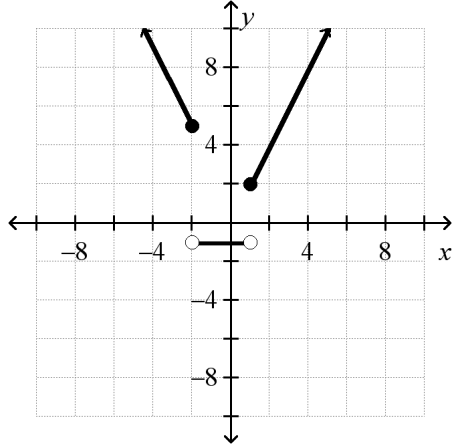
REF: Algebra 1 Sec. 4.7

KEY: piecewise function | graphing piecewise functions | domain | range of a function

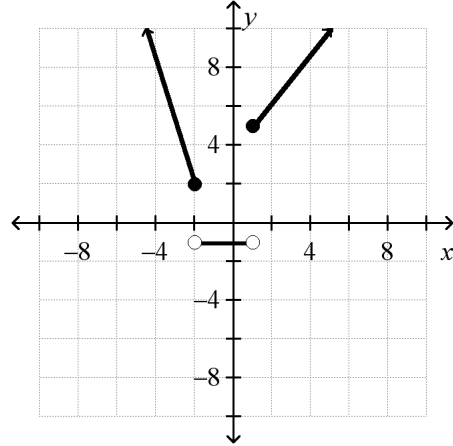
NOT: Example 2

$$17. y = \begin{cases} -2x + 1, & \text{if } x \leq -2 \\ 1, & \text{if } -2 < x < 1 \\ 2x, & \text{if } x \geq 1 \end{cases}$$

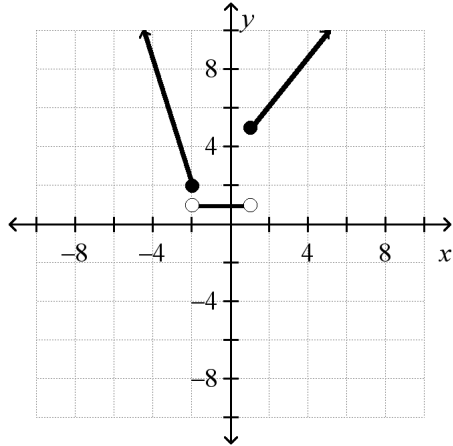
- a. Domain: all real numbers
Range: $y = -1, y \geq 2$



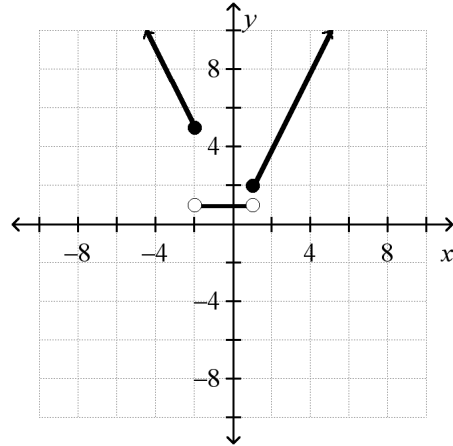
- c. Domain: all real numbers
Range: $y = -1, y \geq 2$



- b. Domain: all real numbers
Range: $y = 1, y \geq 2$



- d. Domain: all real numbers
Range: $y = 1, y \geq 2$



ANS: D

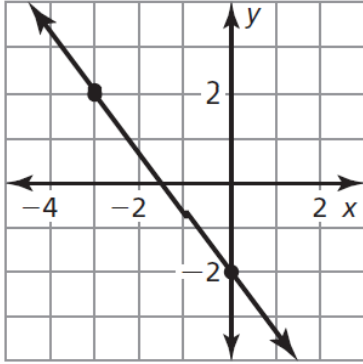
REF: Algebra 1 Sec. 4.7

KEY: piecewise function | graphing piecewise functions | domain | range of a function

NOT: Example 2

Write an equation of the line in slope-intercept form.

18.



ANS:

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

REF: Ch 4 Quiz NOT: Exercise 1

Write an equation in point-slope form of the line that passes through the given points.

19. (4, 1), (-2, 7)

ANS:

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

REF: Ch 4 Quiz NOT: Exercise 4

20. The table shows the distance covered by a spaceship in outer space. Can the situation be modeled by a linear equation? Explain. If possible, write a linear model that represents the distance traveled as a function of time.

Time (seconds)	1	4	7	10	13
Distance (miles)	5	20	35	50	65

ANS:

yes; The rate of change is constant; $y = 5x$

REF: Ch 4 Quiz NOT: Exercise 12

Tell whether a correlation is likely in the situation. Explain your reasoning.

21. the height of a person and the length of their stride

ANS:

yes; The taller you are, the longer your legs are, so your strides will be longer.

REF: Ch 4 Test A NOT: Exercise 23

22. the number of flat tires on your car and the number of pets you own

ANS:

no; There is no relationship between the number of flat tires on your car and the number of pets you own.

REF: Ch 4 Test A NOT: Exercise 24

23. the number of text messages sent daily and the number of meals eaten daily

ANS:

no; The amount of text messages a person sends daily does not affect their diet.

REF: Ch 4 Test A NOT: Exercise 25

24. the amount of gas in a car's tank and the number of miles driven

ANS:

yes; The number of gallons of gas in the tank decreases as more miles are driven.

REF: Ch 4 Test B NOT: Exercise 23

25. the height of a person and the length of the person's hair

ANS:

no; The height of a person has no relationship to the length of their hair.

REF: Ch 4 Test B NOT: Exercise 24

26. For a field trip, a bus company charges a flat fee plus an additional fee per student. For 25 students, the total cost is \$132.50. If there are 30 students, the total cost is \$145.00. Write an equation that represents the total cost y of the field trip for x students. What would the total cost be if 85 students went on the field trip?

ANS:

$$y = 2.5x + 70; \$282.5$$

REF: Algebra 1 Sec. 4.1

NOT: Example 5-2

KEY: application | linear model | writing equations

27. The high school Pep Club is ordering T-shirts for student members. The table below shows the cost y (in dollars) of ordering different numbers x of T-shirts.

Number of T-shirts	30	37	44	51	58
Cost (in dollars)	297	360	423	486	549

- Can the situation be modeled by a linear equation? How do you know?
- Write a linear model for this data if possible.
- According to the model, how much will it cost to purchase 72 T-shirts?

ANS:

- Yes. The rate of change for consecutive data pairs is constant; therefore, the relationship is linear.
- $y = 9x + 27$
- \$675.00

REF: Algebra 1 Sec. 4.2

KEY: application | linear model | linear function | writing equations

NOT: Example 4-3

Use residuals to determine whether the model is a good fit for the data in the table. Explain.

28. $y = 2x + 1$

x	-4	-3	-2	-1	0	1	2	3	4
y	-11	-8	-5	-4	-1	-1	2	6	5

ANS:

no; The residual points are not evenly dispersed about the horizontal axis.

REF: Algebra 1 Sec. 4.5

KEY: residual | using residuals | line of fit | linear model

NOT: Example 1

Tell whether a correlation is likely in this situation. If so, tell whether there is a causal relationship. Explain your reasoning.

29. the age of your parents and the length of your hair

ANS:

no; The age of your parents and the length of your hair are not related.

REF: Algebra 1 Sec. 4.5

KEY: application | causation | distinguishing between correlation and causation | correlation

NOT: Example 5

30. the amount of time spent studying and the score on a test

ANS:

yes; yes; Studying more for a test results in higher scores.

REF: Algebra 1 Sec. 4.5

KEY: application | causation | distinguishing between correlation and causation | correlation

NOT: Example 5

31. a student's grade point average and their future income

ANS:

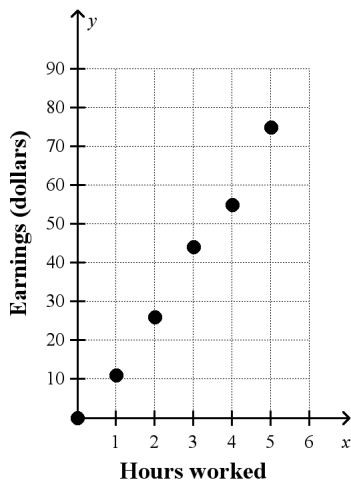
yes; no; A student with a high GPA might be more likely to earn more money in the future, but having a higher GPA does not cause an increase in future income.

REF: Algebra 1 Sec. 4.5

KEY: application | causation | distinguishing between correlation and causation | correlation

NOT: Example 5

32. The scatter plot shows the number of hours worked x and the earnings y (in dollars) of a food server.



a. About how many hours must the server work to earn \$35?

b. About how much did the server earn for 5 hours of work?

c. What tends to happen to the earnings as the number of hours worked increases?

ANS:

a. 2.5 h

b. \$75

c. As the number of hours worked increases, the earnings increases.

REF: Algebra 1 Sec. 4.4

KEY: scatter plot | interpreting scatter plots

NOT: Example 1

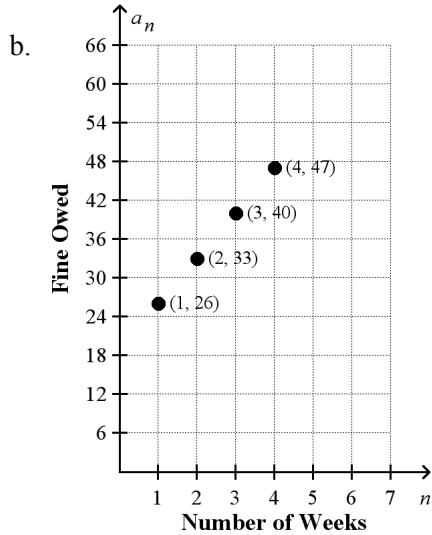
33. Your friend has one week to pay the \$26 fine for a parking ticket. After that, the fine increases \$7 each week.

Week	1	2	3	4
Fine	\$26	\$33	\$40	\$47

- Write a function that represents the arithmetic sequence.
- Graph the function.
- Your friend paid \$75. How many weeks did it take your friend to pay the ticket?

ANS:

a. $f(n) = 7n + 19$



- c. It took 8 weeks.

REF: Algebra 1 Sec. 4.6

KEY: application | sequence | arithmetic sequence | graphing arithmetic sequences | writing arithmetic sequences as functions

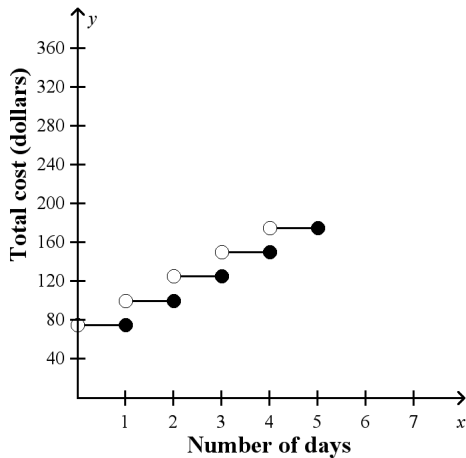
NOT: Example 5-1

34. A car rental company charges by the day to rent a car in addition to requiring each customer to purchase an insurance policy for a flat fee of \$50.00.
- Write and graph a step function that represents the relationship between the number x of days and the total cost y (in dollars) of renting a car for 5 days at a rate of \$25.00 per day.
 - If the rental company offered a rate of \$195.00 per week, would it be a better deal to use that rate if you were renting a car for a week? Explain.

ANS:

a.

$$f(x) = \begin{cases} 75, & \text{if } 0 < x \leq 1 \\ 100, & \text{if } 1 < x \leq 2 \\ 125, & \text{if } 2 < x \leq 3 \\ 150, & \text{if } 3 < x \leq 4 \\ 175, & \text{if } 4 < x \leq 5 \end{cases}$$



- b. No. The total cost for paying by the day for one week is \$225.00 and the total cost for paying the weekly rate for one week is \$245.00.

REF: Algebra 1 Sec. 4.7

KEY: application | step function | writing step functions | graphing step functions

NOT: Example 4-3