Write an equation in slope-intercept form for the line described.

1. slope 1.5, passes through (0, 5)

   ANSWER:

   $y = 1.5x + 5$

2. passes through (–2, 3) and (0, 1)

   ANSWER:

   $y = -x + 1$

3. passes through (3, 5); $m = -2$
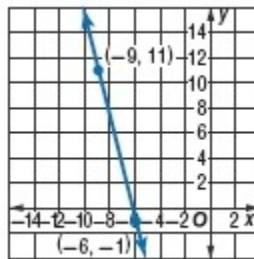
   ANSWER:

   $y = -2x + 11$

4. passes through (–8, –2); $m = \dfrac{5}{2}$

   ANSWER:

   $y = \dfrac{5}{2}x + 18$

5. **MULTIPLE CHOICE** Which is an equation of the line?

   A $y = -4x - 25$

   B $y = -\dfrac{2}{3}x - 5$

   C $y = \dfrac{4}{5}x + \dfrac{29}{25}$

   D $y = 6x + 35$

   ANSWER:
   A

CCSS PERSEVERANCE Write an equation in slope-intercept form for the line that satisfies each set of conditions.

6. passes through (–9, –3), perpendicular to $y = -\dfrac{5}{3}x - 8$

   ANSWER:
   $y = 0.6x + 2.4$

7. passes through (4, –10), parallel to $y = \dfrac{7}{8}x - 3$

   ANSWER:
   $y = \dfrac{7}{8}x - \dfrac{27}{2}$

Write an equation in slope-intercept form for the line described.

8. slope 3, passes through (0, –2)

   ANSWER:

   $y = 3x - 2$

9. slope $-\dfrac{1}{2}$, passes through (0, 5)

   ANSWER:

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

10. slope $-\dfrac{6}{5}$, passes through (0, 8)

    ANSWER:

    $y = -\dfrac{6}{5}x + 8$

11. slope $\dfrac{9}{2}$, passes through $\left(0, -\dfrac{13}{2}\right)$

    ANSWER:

    $y = 4.5x - 6.5$

12. slope –2, passes through (–3, 14)

    ANSWER:

    $y = -2x + 8$

13. slope 4, passes through (6, 9)

    ANSWER:

    $y = 4x - 15$

14. slope $\dfrac{3}{5}$, passes through (–6, –8)

    ANSWER:

    $y = \dfrac{3}{5}x - \dfrac{22}{5}$

15. slope $-\dfrac{1}{4}$, passes through (12, –4)

    ANSWER:

    $y = -\dfrac{1}{4}x - 1$

16. **PART-TIME JOB** Each week, Carmen earns a base pay of $15 plus $0.17 for every pamphlet that she delivers. Write an equation that can be used to find how much Carmen earns each week. How much will she earn the week that she delivers 300 pamphlets?

    ANSWER:

    $y = 0.17x + 15$; $66

Write an equation of the line passing through each pair of points.

17. (–2, –6), (4, 6)

    ANSWER:

    $y = 2x - 2$

18. (–8, –5), (–3, 10)

    ANSWER:

    $y = 3x + 19$

19. (–4, 12), (–2, –4)

    ANSWER:

    $y = -8x - 20$

20. (4.6, 3.4), (2.2, 2.8)

    ANSWER:

    $y = 0.25x + 2.25$

21. (5.5, 0.6), (1.1, 2.8)

    ANSWER:

    $y = -0.5x + 3.35$

22. (–25, –16), (–29, 12)

    ANSWER:

    $y = -7x - 191$

CCSS PERSEVERANCE Write an equation in slope-intercept form for the line that satisfies each set of conditions.

23. passes through (4, 2), perpendicular to $y = -2x + 3$

    ANSWER:

    $y = \dfrac{1}{2}x$

24. passes through (−6, −6), parallel to $y = \frac{4}{3}x + 8$

    ANSWER:

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

25. passes through (12, 0), parallel to $y = -\frac{1}{2}x - 3$

    ANSWER:

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

26. passes through (10, 2), perpendicular to $y = 4x + 6$

    ANSWER:

    $y = -0.25x + 4.5$

27. **FINANCIAL LITERACY** Julio buys a used car for $5900. Monthly expenses for the car—which include insurance, maintenance, and gas—total $180 per month. Write an equation that represents the total cost of buying and owning the car for x months.

    ANSWER:

    $y = 180x + 5900$

28. **DELI** The sales of a sandwich store increased from $52,000 to $116,000 during the first five years of business. Write an equation that models the sales y after x years. Determine what the sales will be at the end of 12 years if the pattern continues.
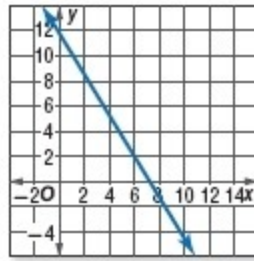
    ANSWER:

    $y = 16{,}000x + 36{,}000$; $228,000

29. **WHALES** In 2009, it was estimated that there were 300 northern right whales in existence. The population of northern right whales is expected to decline by at least 25 whales each generation. Write an equation that represents the number of right whales that will be in existence in x generations.
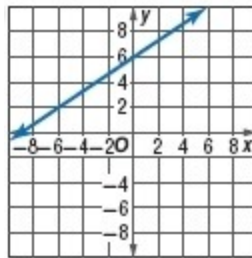
    ANSWER:

    $y = -25x + 300$

Write an equation in slope-intercept form for each graph.
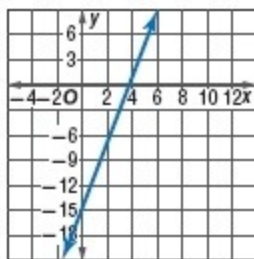

30.

   ANSWER:

   $y = -\frac{5}{3}x + 12$

31.

   ANSWER:

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

32.

   ANSWER:

   $y = 4x - 15$

33. **ROSES** Brad wants to send his girlfriend Kelli a dozen roses. He visits two stores. For what distance do the two stores charge the same amount to deliver a dozen roses?

Full Bloom	Flowers R US
Dozen roses $30	Dozen roses $40
Delivery: $3 per mile	Delivery: $2 per mile

   ANSWER:

   $10 \, \text{mi}$

34. **TYPING** The equation $y = 55(23 - x)$ can be used to model the number of words y you have left to type after x minutes.

   a. Write this equation in slope-intercept form.

   b. Identify the slope and y-intercept.

   c. Find the number of words you have left to type after 20 minutes.

   ANSWER:
   a. $y = -55x + 1265$
   b. −55; 1265
   c. 165 words

35. **RECRUITING** As an army recruiter, Ms. Cooper is paid a daily salary plus commission. When she recruits 10 people, she earns $100. When she recruits 14 people, she earns $120.

   a. Write a linear equation to model this situation.

   b. What is Ms. Cooper's daily salary?

   c. How much would Ms. Cooper earn in a day if she recruits 20 people?
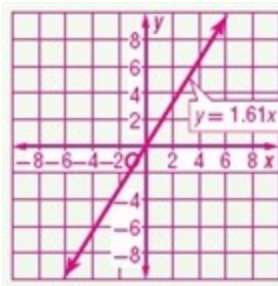
   ANSWER:
   a. $y = 5x + 50$
   b. $50
   c. $150

36. **CCSS MODELING** Refer to the table.

Miles	Kilometers
100	161
50	80.5

   a. Write and graph the linear equation that gives the distance y in kilometers in terms of the number x in miles.

   b. What distance in kilometers corresponds to 20 miles?

   c. What number is the same in kilometers and miles? Explain your reasoning.

   ANSWER:
   a.

   $y = 1.61x$
   b. 32.2 km
   c. 0; because this is the point on the graph where the x-value and the y-value are the same

37. **REASONING** Determine whether the following statement is always, sometimes, or never true. Explain your reasoning.

   The quadrilateral formed by any two parallel lines and two lines perpendicular to those lines is a square.

   ANSWER:
   Sample answer: Sometimes; while the two sets of parallel and perpendicular lines will always form a quadrilateral with four 90º angles, that figure will always be a rectangle, but not necessarily a square.

38. **CHALLENGE** Given $\square ABCD$ with vertices $A(a, b)$, $B(c - a, d)$, $C(c + a, d)$, and $D(c, b)$, write an equation of a line perpendicular to diagonal $\overline{BD}$ that contains A.

    ANSWER:

    Sample answer: $y = \dfrac{ax}{d-b} - \dfrac{a^2}{d-b} + b$

    or

    $y = \dfrac{ax}{d-b} + \dfrac{bd - b^2 - a^2}{d-b}$

39. **REASONING** Write $y = ax + b$ in point-slope form.

    ANSWER:

    Sample answer: $y - 0 = a\left(x + \dfrac{b}{a}\right)$

40. **OPEN ENDED** Write the equations of two parallel lines with negative slopes.

    ANSWER:
    Sample answer: $y = -2x + 3$ and $y = -2x - 1$

41. **REASONING** Write an equation in point-slope form of a line with an x-intercept of c and y-intercept of d.

    ANSWER:

    Sample answer: $y - d = -\dfrac{d}{c}(x - 0)$

42. **WRITING IN MATH** Why do we represent linear equations in more than one form?

    ANSWER:
    Sample answer: Depending on what information is given and what the problem is, it might be easier to represent a linear equation in one form over another. For example, if you are given the slope and the y-intercept, you could represent the equation in slope-intercept form. If you are given a point and the slope, you could represent the equation in point-slope form. If you are trying to graph an equation using the x- and y-intercepts, you could represent the equation in standard form.

43. The total cost c in dollars to go to a water park and ride n water rides is given by the equation $c = 15 + 3n$.

    If the total cost was $33, how many water rides were ridden?

    A 6

    B 7

    C 8

    D 9

    ANSWER:
    A

44. **SHORT RESPONSE** To raise money, the service club bought 1000 candy bars for $0.60 each. If the club sells all of the candy bars for $1 each, what will be their total profit?

    ANSWER:
    $400

45. **PROBABILITY** A fair six-sided die is tossed. What is the probability that a number less than 3 will show on the face of the die?

    F $\dfrac{1}{6}$

    G $\dfrac{1}{3}$

    H $\dfrac{1}{2}$

    J $\dfrac{2}{3}$

    ANSWER:
    G

2-4 Writing Linear Equations

46. **ACT/SAT** What is an equation of the line through $\left(\frac{1}{2}, -\frac{3}{2}\right)$ and $\left(-\frac{1}{2}, \frac{1}{2}\right)$?
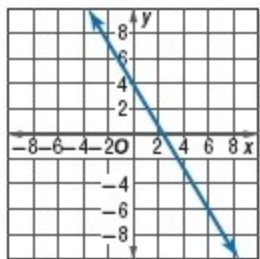
A $y = -2x - \frac{1}{2}$

B $y = -3x$

C $y = 2x - 5$

D $y = \frac{1}{2}x + 1$

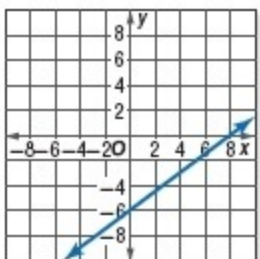E $y = -2x - \frac{5}{2}$

ANSWER:
A

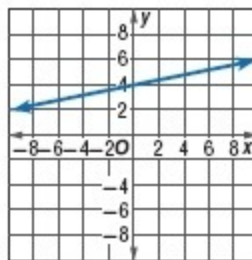**Determine the rate of change of each graph.**

47.

ANSWER:
$-\frac{5}{3}$

48.

ANSWER:
$\frac{3}{4}$

49.

ANSWER:
$\frac{1}{5}$

50. **RECREATION** Scott is currently on page 210 of an epic novel that is 980 pages long. He plans to read 30 pages per day until he finishes the novel. Write and solve a linear relation to determine how many days it will take Scott to complete the novel.

ANSWER:
$30x + 210 = 980$; 26 days

Solve each inequality.

51. $-6x - 4 \leq 12 - 2x$

ANSWER:
$x \geq -4$

52. $\frac{x+2}{5} > -3x + 1$

ANSWER:
$x > \frac{3}{16}$

53. $\frac{5x+3}{3} \geq \frac{4x-2}{5}$

ANSWER:
$x \geq -\frac{21}{13}$

Determine if the triangles with the following lengths are right triangles.

54. 5, 12, 13

ANSWER:
yes

55. 36, 48, 60

    ANSWER:
    yes

56. 7, 23, 25

    ANSWER:
    no

    Multiply.

57. $(4c - 6)(2c + 5)$

    ANSWER:
    $8c^2 + 8c - 30$

58. $(-3b + 2)(b + 3)$

    ANSWER:
    $-3b^2 - 7b + 6$

59. $(2a - 5)(-3a - 4)$

    ANSWER:
    $-6a^2 + 7a + 20$

    Find the slope of the line that passes through each pair of points. Express as a fraction in simplest form.

60. (4, 8), (−2, −6)

    ANSWER:
    $\dfrac{7}{3}$

61. (−6, 3), (−2, 9)

    ANSWER:
    $\dfrac{3}{2}$

62. (−4, −1), (−8, −8)

    ANSWER:
    $\dfrac{7}{4}$

63. (12, 4), (42, 10)

    ANSWER:
    $\dfrac{1}{5}$

64. (10.5, −3), (18, −8)

    ANSWER:
    $-\dfrac{2}{3}$

65. (3.5, −2.5), (−1, −2)

    ANSWER:
    $-\dfrac{1}{9}$