Got It? **5. a.** In Problem 5, suppose the store charged \$15 for each movie. What equation describes the numbers of songs and movies you can purchase for \$60?

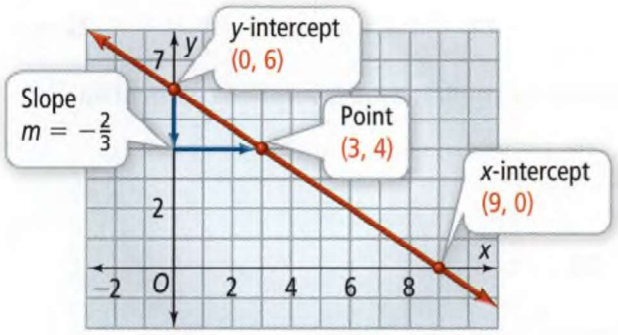
b. Reasoning What domain and range are reasonable for the equation in part (a)? Explain.

take note

Concept Summary Linear Equations

You can describe any line using one or more of these forms of a linear equation. Any two equations for the same line are equivalent.

Graph



Forms

Slope-Intercept Form

$y = mx + b$

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

Point-Slope Form

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

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

Standard Form

$Ax + By = C$

$2x + 3y = 18$

Lesson Check

Do you know HOW?

1. What are the x- and y-intercepts of the graph of $3x - 4y = 9$?
2. What is the graph of $5x + 4y = 20$?
3. Is the graph of $y = -0.5$ a *horizontal line*, a *vertical line*, or *neither*?
4. What is $y = \frac{1}{2}x + 3$ written in standard form using integers?
5. A store sells gift cards in preset amounts. You can purchase gift cards for \$10 or \$25. You have spent \$285 on gift cards. Write an equation in standard form to represent this situation. What are three combinations of gift cards you could have purchased?

Do you UNDERSTAND? MATHEMATICAL PRACTICES

6. Vocabulary Tell whether each linear equation is in *slope-intercept form*, *point-slope form*, or *standard form*.

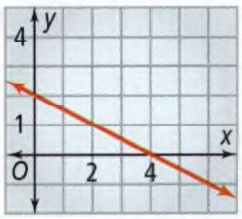
a. $y + 5 = -(x - 2)$

b. $y = -2x + 5$

c. $y - 10 = -2(x - 1)$

d. $2x + 4y = 12$

7. Reasoning Which form would you use to write an equation of the line at the right: *slope-intercept form*, *point-slope form*, or *standard form*? Explain.



Practice and Problem-Solving Exercises

A Practice

Find the x- and y-intercepts of the graph of each equation. See Problem 1.

8. $x + y = 9$ **9.** $x - 2y = 2$ **10.** $-3x + 3y = 7$

11. $3x - 5y = -20$ **12.** $7x - y = 21$ **13.** $-5x + 3y = -7.5$

Draw a line with the given intercepts. See Problem 2.

14. x-intercept: 3, y-intercept: 5 **15.** x-intercept: -1, y-intercept: -4 **16.** x-intercept: 4, y-intercept: -3

Graph each equation using x- and y-intercepts.

17. $x + y = 4$ **18.** $x + y = -3$ **19.** $x - y = -8$

20. $-2x + y = 8$ **21.** $-4x + y = -12$ **22.** $6x - 2y = 18$

For each equation, tell whether its graph is a ***horizontal*** or a ***vertical*** line. See Problem 3.

23. $y = -4$ **24.** $x = 3$ **25.** $y = \frac{7}{4}$ **26.** $x = -1.8$

Graph each equation.

27. $y = 6$ **28.** $x = -3$ **29.** $y = -2$ **30.** $x = 7$

Write each equation in standard form using integers. See Problem 4.

31. $y = 2x + 5$ **32.** $y + 3 = 4(x - 1)$ **33.** $y - 4 = -2(x - 3)$

34. $y = \frac{1}{4}x - 2$ **35.** $y = -\frac{2}{3}x - 1$ **36.** $y + 2 = \frac{2}{3}(x + 4)$

37. Video Games In a video game, you earn 5 points for each jewel you find. You earn 2 points for each star you find. Write and graph an equation that represents the numbers of jewels and stars you must find to earn 250 points. What are three combinations of jewels and stars you can find that will earn you 250 points? See Problem 5.

38. Clothing A store sells T-shirts for \$12 each and sweatshirts for \$15 each. You plan to spend \$120 on T-shirts and sweatshirts. Write and graph an equation that represents this situation. What are three combinations of T-shirts and sweatshirts you can buy for \$120?

B Apply

39. Writing The three forms of linear equations you have studied are slope-intercept form, point-slope form, and standard form. Explain when each form is most useful.

40. Think About a Plan You are preparing a fruit salad. You want the total carbohydrates from pineapple and watermelon to equal 24 g. Pineapple has 3 g of carbohydrates per ounce and watermelon has 2 g of carbohydrates per ounce. What is a graph that shows all possible combinations of ounces of pineapple and ounces of watermelon?

- Can you write an equation to model the situation?
- What domain and range are reasonable for the graph?

41. Compare and Contrast Graph $3x + y = 6$, $3x - y = 6$, and $-3x + y = 6$. How are the graphs similar? How are they different?

42. Reasoning What are the slope and y-intercept of the graph of $Ax + By = C$?

43. Error Analysis A student says the equation $y = 4x + 1$ can be written in standard form as $4x - y = 1$. Describe and correct the student's error.

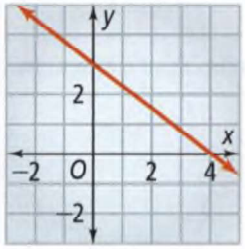
44. Reasoning The coefficients of x and y in the standard form of a linear equation cannot both be zero. Explain why.

Graphing Calculator **Use a graphing calculator to graph each equation. Make a sketch of the graph. Include the x- and y-intercepts.**

45. $2x - 8y = -16$ **46.** $-3x - 4y = 0$ **47.** $x + 3.5y = 7$

48. $-x + 2y = -8$ **49.** $3x + 3y = -15$ **50.** $4x - 6y = 9$

51. Compare and Contrast The graph below represents one function, and the table represents a different function. How are the functions similar? How are they different?



x	−4	−2	0	2	4
y	5	4	3	2	1

Find the x- and y-intercepts of the line that passes through the given points.

52. $(-6, 4), (3, -5)$ **53.** $(-5, -5), (4, -2)$ **54.** $(-7, 6), (-4, 11)$

55. $(-2, 8), (4, 2)$ **56.** $(3, -8), (-4, 13)$ **57.** $(5, 0.4), (-1, -2)$

58. Sports The scoreboard for a football game is shown at the right. All of the points the home team scored came from field goals worth 3 points and touchdowns with successful extra-point attempts worth 7 points. Write and graph a linear equation that represents this situation. List every possible combination of field goals and touchdowns the team could have scored.

Challenge

59. Geometry Graph $x + 4y = 8$, $4x - y = -1$, $x + 4y = -12$, and $4x - y = 20$ in the same coordinate plane. What figure do the four lines appear to form?

Write an equation of each line in standard form.

60. The line contains the point $(-4, -7)$ and has the same slope as the graph of $y + 3 = 5(x + 4)$.

61. The line has the same slope as $4x - y = 5$ and the same y-intercept as the graph of $3y - 13x = 6$.