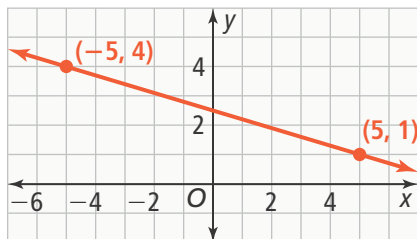**UNDERSTAND**

11. Use the graph of the line shown.

a. Write a point-slope form of the equation for the line shown.

b. Estimate the value of the y-intercept of the line.

c. Construct Arguments Use proportional reasoning to support your conjecture about the value of the y-intercept.

d. Rewrite the point-slope form of the equation in slope-intercept form to check your conjecture.

12. Error Analysis Describe and correct the error a student made when graphing $y + 5 = -\frac{3}{4}(x - 8)$.

> 1. Plot a point at (-5, 8).
> 2. Plot a point 3 units down and 4 units right from (-5, 8) at (-1, 5).
> 3. Connect the points with a line. ✗

13. Higher Order Thinking In slope-intercept form $y = mx + b$, the y-intercept is located at $(0, b)$.

a. What equation do you get when you substitute $(0, b)$ for (x_1, y_1) in point-slope form $y - y_1 = m(x - x_1)$?

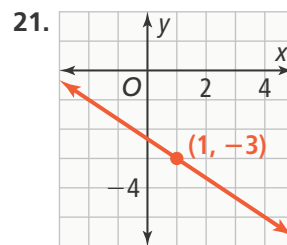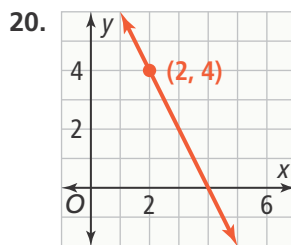**b.** How are the slope-intercept and the point-slope forms related?

PRACTICE

Write the equation in point-slope form of the line that passes through the given point with the given slope. **SEE EXAMPLES 1, 2, AND 3**

14. $(3, 1); m = 2$

15. $(2, -2); m = -4$

16. $(2, -8); m = -\frac{3}{4}$

17. $(-1, 4); m = \frac{2}{3}$

18. $(-\frac{1}{2}, 2); m = -1$

19. $(3.5, 7.5); m = 1.5$

Write the equation of the line in point-slope form. **SEE EXAMPLES 2 AND 3**

20.

21.

Write an equation of the line in point-slope form that passes through the given points. **SEE EXAMPLE 2**

22. $(2, 4)$ and $(3, 6)$

23. $(-1, -7)$ and $(2, -4)$

24. $(3, -5)$ and $(1, -8)$

25. $(-4, 12)$ and $(-7, -3)$

26. $(-4, -2)$ and $(1, 6)$

27. $(3, -\frac{1}{2})$ and $(1, \frac{3}{2})$

Sketch the graph of each equation. **SEE EXAMPLE 3**

28. $y + 2 = -3(x + 2)$

29. $y - 2 = 4(x - 1)$

30. $y + 1 = \frac{3}{2}(x - 1)$

31. $y - 3 = \frac{2}{5}(x + 1)$

32. $y - 1 = \frac{5}{4}(x + 2)$

33. $y + 5 = \frac{1}{2}(x + 3)$

Write an equation of the line in point-slope form that passes through the given points in each table. Then write each equation in slope-intercept form. **SEE EXAMPLE 4**

34.

x	y
15	100
20	115
25	130
30	145
35	160

35.

x	y
-4	-21
-2	-18
0	-15
2	-12
4	-9

PRACTICE & PROBLEM SOLVING

APPLY

36. Model With Mathematics Liam rented a pedal board for 5.5 hours and paid a total of $93.75. What is an equation in point-slope form that models the cost of renting a pedal board for x hours? How can Liam use the equation to find the one-time service charge?

PEDAL BOARD RENTAL

$12.50/hour plus one-time service fee
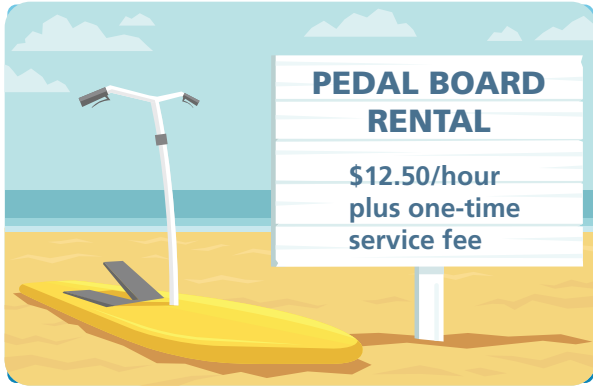
37. Make Sense and Persevere Emery borrowed money from her brother to buy a new phone, and is paying off a fixed amount each week. After 2 weeks, she will owe $456, and after 5 weeks, she will owe $228.

  a. What was the original amount Emery borrowed?

  b. How much does she pay each week?

  c. How useful are equations in point-slope and slope-intercept forms for answering each question?

38. Generalize The total price of a printing job at Incredible Invites includes the cost per invitation plus a one-time set-up fee.

25 invitations	50 invitations	75 invitations	100 invitations
$100	**$140**	**$180**	**$220**

Write equations in point-slope and slope-intercept forms to model the situation. What part of the equations represents the cost per invitation? Which form is easier to use to find information about the set-up fee? Explain.

ASSESSMENT PRACTICE

39. The line $y - 5 = \frac{9}{7}(x + 4)$ is graphed in the coordinate plane.

By inspecting the equation, you can see the graph of the line has a slope of _____ and passes through the point _____ .

Using the point and the slope, you can plot a second point _____ and then graph the line through the two points.

40. SAT/ACT A line with a slope of −2 passes through the point (3, −2). Which of the following is the equation of the line?

  Ⓐ $y + 2 = -2(x - 3)$ Ⓑ $y - 2 = -2(x - 3)$

  Ⓒ $y - 2 = -2(x + 3)$ Ⓓ $y + 2 = 2(x - 3)$

  Ⓔ $y - 2 = 2(x + 3)$

41. Performance Task A railway system on a hillside moves passengers at a constant rate to an elevation of 50 m. The elevations of a train are given for 2 different locations.

50 m

20 m after 42 s

9 m after 14.5 s

Part A Write an equation in point-slope form to represent the elevation of the train in terms of time. How can you use the equation to find the rate of increase in elevation of the train in meters per second?

Part B At what elevation does the train start initially? Write a linear equation in a form that gives the information as part of the equation. Explain your reasoning.