4.2 Start Thinking

How can you find a linear equation from a graph for which you do not know the y-intercept? Describe a situation in which you might know the slope but not the y-intercept. Provide a graph of this situation.

4.2 Warm Up

Write an equation in slope-intercept form with the given slope and y-intercept.

1. $m = -3;\ b = 6$

2. $m = \frac{3}{2};\ b = 2$

3. $m = 2;\ b = -2$

4. $m = -\frac{1}{2};\ b = 4$

5. $m = 1;\ b = 5$

6. $m = -2;\ b = 9$

4.2 Cumulative Review Warm Up

Solve the formula for the indicated variable.

1. Profit: $P = R - C;$ Solve for R.

2. Volume of a cylinder: $V = \pi r^2 h;$ Solve for r.

3. Area of a trapezoid: $A = \frac{1}{2}h(b_1 + b_2);$ Solve for h.

4. Average acceleration of an object: $a = \frac{v_1 - v_0}{t};$ Solve for t.

Name_____ Date _____

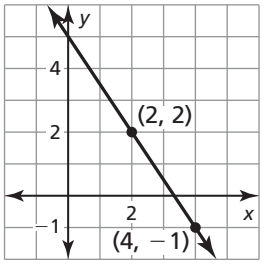
4.2 Practice A

In Exercises 1–3, write an equation in point-slope form of the line that passes through the given point and has the given slope.

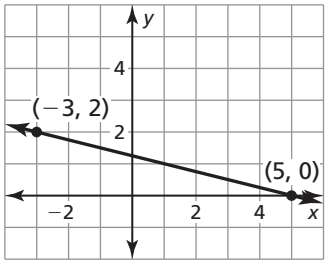
1. $(3, 1)$; $m = 4$ **2.** $(2, 7)$; $m = -3$ **3.** $(4, -3)$; $m = -5$

In Exercises 4 and 5, write an equation in slope-intercept form of the line shown.

4.



5.



In Exercises 6–8, write an equation in slope-intercept form of the line that passes through the given points.

6. $(6, 3), (3, 10)$ **7.** $(5, -4), (15, 2)$ **8.** $(4, -3), (2, -9)$

In Exercises 9–11, write a linear function *f* with the given values.

9. $f(1) = 3, f(3) = 4$ **10.** $f(6) = 9, f(-5) = 0$ **11.** $f(-3) = 5, f(3) = 5$

In Exercises 12 and 13, tell whether the data in the table can be modeled by a linear equation. Explain. If possible, write a linear equation that represents *y* as a function of *x*.

12.

x	1	3	5	7	9
y	−2	4	7	14	22

13.

x	−2	0	2	4	6
y	−3	0	3	6	9

14. You are renting a paddle board. The company charges a $50 fee and $20 per half-day.

a. Write an equation that represents the total cost (in dollars) of renting a paddle board as a function of the number of half-days.

b. Find the total cost of renting a paddle board for 7 half-days.

Name _____ Date _____

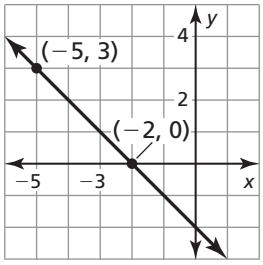
4.2 Practice B

In Exercises 1–3, write an equation in point-slope form of the line that passes through the given point and has the given slope.

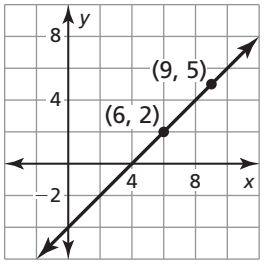
1. $(-4, 5); m = 1$ **2.** $(3, 4); m = \frac{1}{3}$ **3.** $(2, -6); m = -\frac{1}{4}$

In Exercises 4 and 5, write an equation in slope-intercept form of the line shown.

4.



5.



In Exercises 6–8, write an equation in slope-intercept form of the line that passes through the given points.

6. $(-3, 6), (-5, -6)$ **7.** $(2, -4), (5, -4)$ **8.** $(-7, 18), (7, 14)$

In Exercises 9–11, write a linear function *f* with the given values.

9. $f(-5) = 2, f(7) = -4$ **10.** $f(-2) = 1, f(12) = 7$ **11.** $f(-8) = 12, f(-3) = -3$

In Exercises 12 and 13, tell whether the data in the table can be modeled by a linear equation. Explain. If possible, write a linear equation that represents *y* as a function of *x*.

12.

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

13.

x	0	2	4	6	8
y	1	2	4	8	16

14. The equation $y - 2 = \frac{5}{4}(x + 8)$ represents the cost (in dollars) of making your own juice (in fluid ounces).

a. What is the slope of the line? Interpret the slope in the context of this situation.

b. Write the equation as a linear function.

c. Use the linear function in part (b) to determine the base cost of making your own juice.

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4.2 Enrichment and Extension

Challenge: Writing Point-Slope Form

Point-slope form of a line is very applicable in both algebra and geometry. It is very simple to write point-slope form from a figure or line on a graph, but suppose you had another form of an equation. How would you rewrite it in point-slope form?

Example: If $\frac{1}{3}y - x = -\frac{1}{6}x - 3,$ write the point-slope form of the line given (you must get whole-number coordinates).

$\frac{1}{3}y - x = -\frac{1}{6}x - 3$

$6\left(\frac{1}{3}y - x\right) = 6\left(-\frac{1}{6}x - 3\right)$ Multiply each side by 6.

$2y - 6x = -x - 18$

$2y = 5x - 18$ Combine like terms.

$2y - 2 = 5x - 18 - 2$ Because 18 is not divisible by 5, subtract 2 from each side.

$2y - 2 = 5x - 20$

$2(y - 1) = 5(x - 4)$ Factor 2 from the left side of the equation, and factor 5 from the right.

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

In Exercises 1–4, write the linear equation in point-slope form. You must try to get whole-number coordinates.

1. $\frac{1}{4}y - 1 = \frac{1}{2}x + 7$
2. $-\frac{1}{10}y - 3 = \frac{1}{5}x$
3. $\frac{1}{2}y - 3x = -x - 1$
4. $2y - 4 = 3x + 5$

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4.2 Puzzle Time

What Did The Wall Say To The Bookcase?

Write the letter of each answer in the box containing the exercise number.

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

1. $(5, 6), m = 4$

2. $(-7, 0), m = -\frac{1}{8}$

3. $(-1, -2), m = -1$

4. $(-3, 11), m = \frac{4}{9}$

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

5. $(9, 4), (4, -11)$

6. $(8, 10), (12, 13)$

7. $(14, -15), (7, -15)$

8. $(6, 1), (4, 16)$

Write a linear function *f* with the given values.

9. $f(3) = -3, f(2) = 2$

10. $f(3) = 9, f(-4) = 2$

11. $f(-10) = 4, f(8) = -5$

12. $f(-12) = 6, f(-4) = 6$

13. You pay a registration fee and a monthly fee to join a local fitness center. The table shows the total cost of joining the fitness center for different numbers of months. Write an equation that represents the total cost (in dollars) of joining the fitness center as a function of the number of months.

Months, *x*	3	5	7
Total cost (dollars), *f*(*x*)	100	140	180

Answers

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

H. $f(x) = 20x + 40$

Y. $y = -7.5x + 46$

E. $y - 6 = 4(x - 5)$

S. $y = -15$

E. $y = 0.75x + 4$

F. $y - 11 = \frac{4}{9}(x + 3)$

R. $f(x) = x + 6$

H. $f(x) = -0.5x - 1$

P. $f(x) = -5x + 12$

U. $y - 0 = -\frac{1}{8}(x + 7)$

O. $y = 3x - 23$

L. $f(x) = 6$

11	6	3	9		8	5	2	10	7	13	1	12	4