

4.1 Start Thinking

In order to graph a linear equation in slope-intercept form, what do you need to know? What does the equation look like when the y -intercept of the line is equal to 0? What does the equation look like when it also has a slope equal to 1?

4.1 Warm Up

Graph the linear equation in a coordinate plane.

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

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

3. $y = -1$

4. $y = -2x - 4$

5. $y = \frac{2}{3}x + 2$

6. $x = -2$

4.1 Cumulative Review Warm Up

Determine whether the table represents a *linear* or *nonlinear* function. Explain.

1.

x	2	3	4	5
y	4	9	14	19

2.

x	6	8	10	12
y	-10	-4	-2	2

3.

x	-3	-1	1	3
y	0	2	2	0

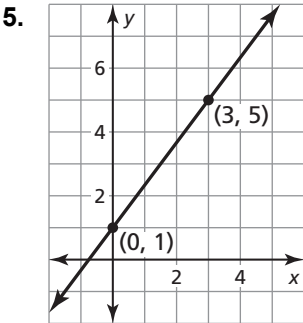
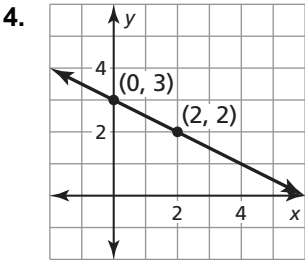
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Practice A

In Exercises 1–3, write an equation of the line with the given slope and y-intercept.

- 1. slope: 3
y-intercept: 8
- 2. slope: -4
y-intercept: 0
- 3. slope: 0
y-intercept: -2

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



In Exercises 6–8, write an equation of the line that passes through the given points.

- 6. $(2, 3), (0, 9)$
- 7. $(5, -2), (0, -2)$
- 8. $(-1, 4), (0, -2)$

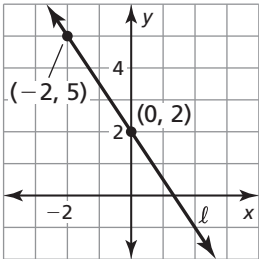
In Exercises 9–11, write a linear function f with the given values.

- 9. $f(0) = 3, f(1) = 5$
- 10. $f(0) = 9, f(2) = 4$
- 11. $f(3) = -2, f(0) = 1$

12. In 2003, a gallon of gas cost \$1.75. In 2013, a gallon of gas cost \$3.50.

- a. Write a linear model that represents the cost (in dollars) of a gallon of gas as a function of the number of years since 2003.
- b. Use the model to predict the cost of a gallon of gas in 2023.

13. Line ℓ is a reflection in the y -axis of line k . Write an equation that represents line k .



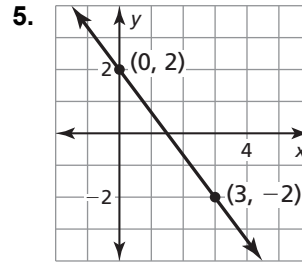
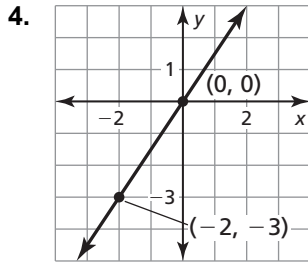
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Practice B

In Exercises 1–3, write an equation of the line with the given slope and y -intercept.

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|----------------------|-------------------------------|--------------------------|
| 1. slope: 3 | 2. slope: 0 | 3. slope: $-\frac{2}{5}$ |
| y -intercept: -9 | y -intercept: $\frac{1}{3}$ | y -intercept: 7 |

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



In Exercises 6–8, write an equation of the line that passes through the given points.

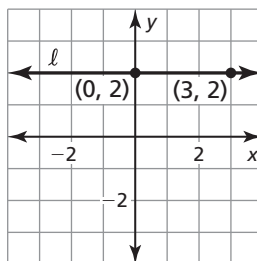
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|----------------------|-------------------------|------------------------|
| 6. $(4, 0), (0, -7)$ | 7. $(0, -3), (-2.5, 2)$ | 8. $(0, 4), (-6, 1.5)$ |
|----------------------|-------------------------|------------------------|

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

- | | | |
|---------------------------|----------------------------|----------------------------|
| 9. $f(6) = -2, f(0) = -5$ | 10. $f(0) = -1, f(2) = -1$ | 11. $f(-4) = 3, f(0) = -2$ |
|---------------------------|----------------------------|----------------------------|

12. A T-shirt design company charges your team an initial fee of \$25 to create the team's design. Each T-shirt printed with your design costs an additional \$8.
- Write a linear model that represents the total cost of purchasing your team's T-shirts with your design as a function of the number of T-shirts.
 - Your team has 35 members. If a T-shirt is purchased for every member, what would be the cost?

13. Line ℓ is a reflection in the x -axis of line k . Write an equation that represents line k .



4.1 Enrichment and Extension

Coordinate Geometry: Area of a Polygon

How would you find the area of a triangle when the figure has no sides parallel to either axis?

Find the area of the triangle whose vertices are $A(-1, 0)$, $B(3, 2)$, and $C(2, -3)$.

A method for finding area is to include the triangle in a rectangle, find the area of the right triangles formed, and subtract those areas from the total area of the rectangle.

Area of rectangle = 20 square units

Area of triangle $X = \frac{1}{2} \cdot 2 \cdot 4 = 4$ square units

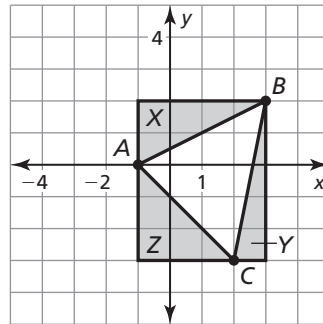
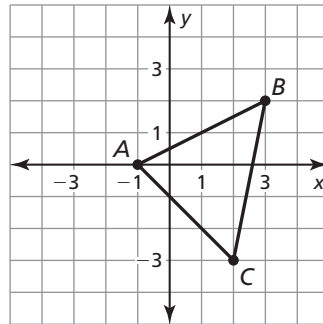
Area of triangle $Y = \frac{1}{2} \cdot 1 \cdot 5 = 2.5$ square units

Area of triangle $Z = \frac{1}{2} \cdot 3 \cdot 3 = 4.5$ square units

Area of $\triangle ABC = 20 - (4 + 2.5 + 4.5) = 20 - 11 = 9$ square units

In Exercises 1–5, find the area of the figure with the given vertices.

1. $X(-4, 2)$, $Y(1, 0)$, $Z(-2, -2)$
2. $E(0, 0)$, $F(-2, 3)$, $G(-5, -4)$
3. $A(-4, 3)$, $B(8, 10)$, $C(-2, -4)$
4. $J(-2, 2)$, $K(2, 4)$, $L(5, 0)$, $M(0, -2)$
5. $P(-3, 0)$, $Q(-2, 4)$, $R(2, 3)$, $S(2, 1)$, $T(1, -3)$



4.1 Puzzle Time

What Paces Back And Forth On The Ocean Floor?

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

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

1. slope: 3; y-intercept: -8
2. slope: $\frac{3}{4}$; y-intercept: 9
3. slope: $-\frac{1}{2}$; y-intercept: 0
4. slope: 5; y-intercept: $\frac{7}{8}$

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

5. (4, 2), (0, -6)
6. (2, -3), (0, -3)
7. (3, 0), (0, 4)
8. (0, -11), (9, 7)
9. (-8, 0.6), (0, 1.4)

Write a linear function f with the given values.

10. $f(0) = -7, f(7) = 1$
11. $f(-10) = 0, f(0) = 5$
12. $f(12) = -\frac{1}{3}, f(0) = -\frac{1}{3}$
13. The water park charges \$125 for a birthday party. Guests cost \$12 each. Write a linear model that represents the total cost of a birthday party y as a function of the number of guests x .

Answers

K. $f(x) = \frac{1}{2}x + 5$

E. $y = \frac{3}{4}x + 9$

R. $y = -\frac{4}{3}x + 4$

S. $y = 5x + \frac{7}{8}$

W. $f(x) = -\frac{1}{3}$

V. $y = 2x - 11$

E. $y = 3x - 8$

A. $y = -3$

R. $y = 2x - 6$

C. $y = 0.1x + 1.4$

O. $y = -\frac{1}{2}x$

U. $f(x) = \frac{8}{7}x - 7$

N. $y = 12x + 125$

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