

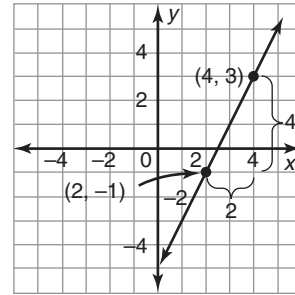
Reteaching 4-1

Understanding Slope

The *slope of a line* is $\frac{\text{change in } y}{\text{change in } x}$, found by using two points on the line.

Find the slope of the line that passes through these two points:
(4, 3) and (2, -1).

- To find the change in y , subtract one y -coordinate from the other:
 $(3 - (-1)) = 4$.
- To find the change in x , subtract one x -coordinate from the other:
 $(4 - 2) = 2$.



When you find the slope of a line, the y -coordinate you use first for the rise must belong to the same point as the x -coordinate you use first for the run.

The slope of the line is: $\frac{\text{change in } y}{\text{change in } x} = \frac{3 - (-1)}{4 - 2} = \frac{4}{2} = 2$

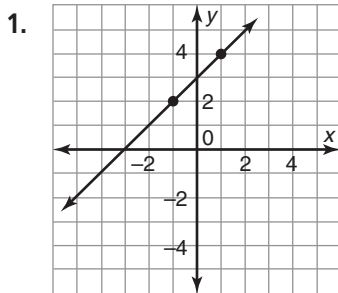
A table of values from the graph also shows the slope.

	$\overset{-1}{\text{change in } x}$				
x	5	4	3	2	1
y	5	3	1	-1	-3
	$\underset{-2}{\text{change in } y}$				

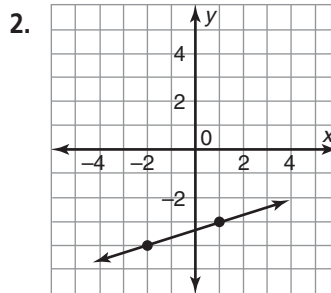
Compare the change in each coordinate.

$$\frac{\text{change in } y}{\text{change in } x} = \frac{-2}{-1} = 2$$

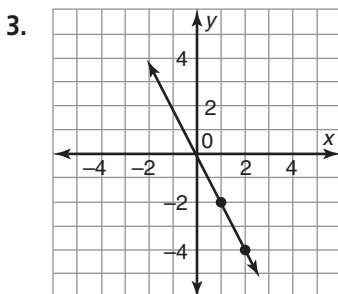
Find the slope of each line.



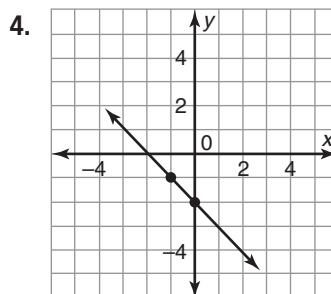
slope = 1



slope = $\frac{1}{3}$



slope = -2



slope = -1

Reteaching 4-2

Graphing Linear Functions

You can graph a function in the coordinate plane. To plot points for the graph, use *input* as x -values (x -axis) and *output* as y -values (y -axis).

output as y-values *input as x-values*

$$\begin{array}{ccc} \downarrow & & \downarrow \\ y = 2x + 4 \end{array}$$

This function has the form of a linear equation and is called a *linear function*. To draw its graph, use

slope and y -intercept: $y = 2x + 4$

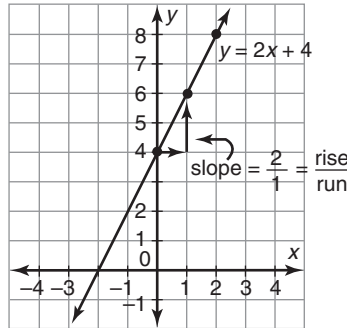
slope = 2

y -intercept = 4

or

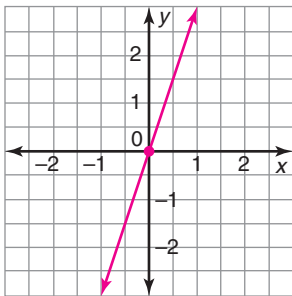
plot points from a table and connect them in a line.

x	y
0	4
1	6
2	8

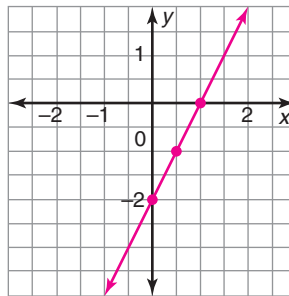


Graph each linear function.

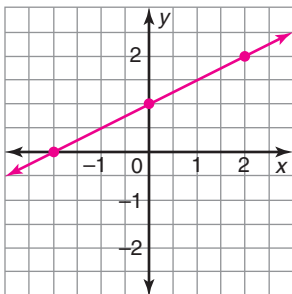
1. $y = 3x$



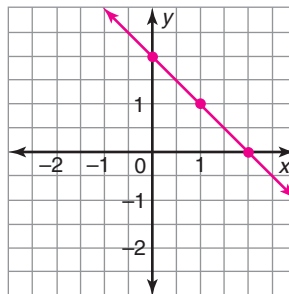
2. $y = 2x - 2$



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



4. $y = 2 - x$



Reteaching 4-3

Writing Rules for Linear Functions

Sometimes you can write a function rule to describe a situation.

Cookies at a bazaar sell for \$2 each. The booth costs \$25 to rent for the day. The profit depends on how many cookies are sold.

Words: Profit = $2 \times$ (number of cookies sold) - \$25

Function rule: $y = 2x - 25$

The output y is the profit.

The input x is the number of cookies sold.

You can use the graph of a linear function to write its function rule.

First, you need to find the slope and the y -intercept.

① From the graph, the slope (m) is $-\frac{1}{2}$.

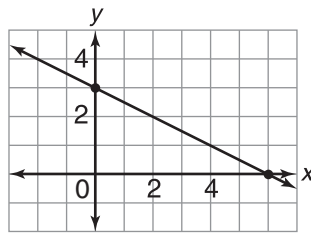
② The point $(0, 3)$ is on the graph so the y -intercept (b) is 3.

③ Substitute in the slope-intercept form.

$$y = mx + b$$

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

The function rule is $y = -\frac{1}{2}x + 3$.



Write a function rule for each situation. Identify the x and y variables.

1. A person burns 350 calories for every hour of bicycling. The number of calories burned is a function of the number of hours spent bicycling.

$y = 350x$; $x =$ number of hours;

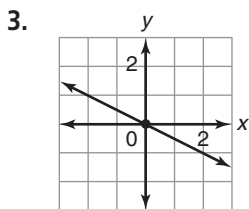
$y =$ number of calories

2. Janice earns \$150 a week plus a commission of \$3 for every magazine she sells. Her total pay depends on how many magazines she sells.

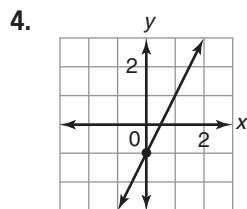
$y = 3x + 150$; $x =$ number of magazines;

$y =$ total pay

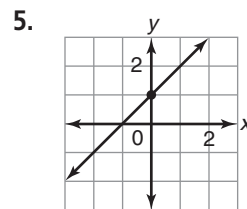
Identify the slope and y -intercept of each graph. Then write a linear function rule.



$m = -\frac{1}{2}$; $b = 0$; $y = -\frac{1}{2}x$



$m = 2$; $b = -1$; $y = 2x - 1$



$m = 1$; $b = 1$; $y = x + 1$

Reteaching 4-4

Comparing Functions

Find the slope to compare the rate of change.

Use two values from a table.

x	1	2	3	4
y	1	4	7	10

(2, 4) and (4, 10)

$$\text{slope} = \frac{10 - 4}{4 - 2} = \frac{6}{2} = 3$$

Use the equation $y = mx + b$.

$$y = 2x + 5$$

$$y = mx + b.$$

↓

The slope is m , which is 2.

$$y = 2x + 5$$

$3 > 2$, so the function in the table has the greater rate of change.

For Questions 1–4, match each linear function with its rate of change.

1. Austin pays a registration fee of \$10 plus \$1 for every audiobook he borrows. A. 4

D

2. C B. 3

x	1	3	4	6
y	5	9	11	15

3. (1, 5), (2, 9) C. 2

A

4. $y = 3x - 1$ D. 1

B

5. Which function has the greater rate of change?

$$y = 2x - 4$$

x	2	3	4	5
y	1	2	3	4

$$y = 2x - 4$$