

## 4.1

## Notetaking with Vocabulary

I can write equations in slope-intercept form.

I can use linear equations to solve real-life problems (mathematical modeling).

Write the meaning of each vocabulary term.

linear model - a linear function that models a real life situation.

- use when a quantity ( $y$ ) changes at a constant rate relative to another quantity ( $x$ ), you can use  $y = mx + b$ .

-  $m$  is the constant rate of change,  $b$  is the initial/starting value

- "write  $y$  as a function of  $x$ "  $\rightarrow$  use  $y = mx + b$

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

1. slope:  $0 = m$

$y$ -intercept:  $9 = b$

$$y = 0x + 9$$

$$y = 9$$

2. slope:  $-1$

$y$ -intercept:  $0$

$$y = -1x + 0$$

$$y = -x$$

3. slope:  $2$

$y$ -intercept:  $-3$

$$y = 2x - 3$$

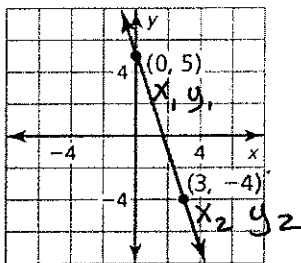
$$y = mx + b$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

In Exercises 4 - 6, write an equation of the line in slope-intercept form.

$y$ -int  $(0, b)$

4.



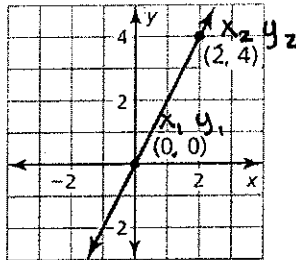
$$b = 5$$

$$m = \frac{-4 - 5}{3 - 0} = \frac{-9}{3}$$

$$m = -3$$

$$y = -3x + 5$$

5.



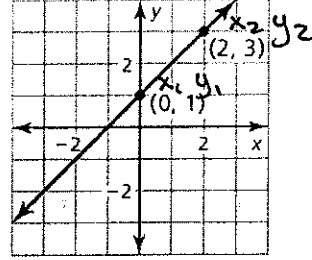
$$b = 0$$

$$m = \frac{4 - 0}{2 - 0} = \frac{4}{2} = 2$$

$$y = 2x + 0$$

$$y = 2x$$

6.



$$b = 1$$

$$m = \frac{3 - 1}{2 - 0} = \frac{2}{2} = 1$$

$$y = 1x + 1$$

$$y = x + 1$$

### 4.1 Notetaking with Vocabulary (continued)

$y$ -int.  $(0, b)$

In Exercises 7 - 9, write an equation of the line that passes through the given points.

$b = -4$

7.  $(0, -4), (8, 4)$

$x_1, y_1, x_2, y_2$

$$m = \frac{4 - (-4)}{8 - 0}$$

$$m = \frac{8}{8} = 1$$

$$y = 1x - 4$$

$$y = x - 4$$

$b = -7$

8.  $(2, 1), (0, -7)$

$x_2, y_2, x_1, y_1$

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

$$m = 4$$

$$y = 4x - 7$$

$b = 2$

9.  $(0, 2), (4, 3)$

$x_1, y_1, x_2, y_2$

$$m = \frac{3 - 2}{4 - 0} = \frac{1}{4}$$

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

In Exercises 10 - 12, write a linear function  $f$  with the given values.

10.  $f(0) = -5, f(4) = -3$

$(0, -5), (4, -3)$   
 $x_1, y_1, x_2, y_2$

$$m = \frac{-3 - (-5)}{4 - 0} = \frac{2}{4} = \frac{1}{2}$$

$$y = \frac{1}{2}x - 5$$

12.  $f(-5) = 5, f(0) = 10$

$(-5, 5), (0, 10)$   
 $x_1, y_1, x_2, y_2$

$$m = \frac{10 - 5}{0 - (-5)} = \frac{5}{5}$$

$$m = 1$$

$$y = 1x + 10$$

$$y = x + 10$$

13.  $f(0) = 5, f(9) = -4$

$(0, 5), (9, -4)$   
 $x_2, y_2, x_1, y_1$

$$m = \frac{-4 - 5}{9 - 0} = \frac{-9}{9} = -1$$

$$y = -1x + 5$$

$$y = -x + 5$$

14. An electrician charges an initial fee of \$50 and \$190 after 4 hours of work.

a. Write a linear model that represents the total cost as a function of the number of hours worked.

$(0, 50), (4, 190)$   $b = 50$   
 $x_1, y_1, x_2, y_2$

$$m = \frac{190 - 50}{4 - 0} = \frac{140}{4} = 35$$

$$y = 35x + 50$$

b. How much does the electrician charge per hour?

rate

He charges \$35 per hour.