

## Problems with the homework?

p. 340: #13, 18

p. 349: #5, 7, 9, 10, 13, 16, 17

Review...

Formulas for slope

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad m = \frac{\Delta y}{\Delta x} \quad m = \frac{\text{change in } y}{\text{change in } x} \quad m = \frac{\text{rise}}{\text{run}}$$

Another name for slope ROC (Rate of Change)Parallel Lines Same slopePerpendicular lines- m has negative reciprocal

## 6.4 Slope-Intercept Form of the Equation for a Linear Function

### LESSON FOCUS

Relate the graph of a linear function to its equation in slope-intercept form.

### Make Connections

This graph shows a cyclist's journey where the distance is measured from her home.

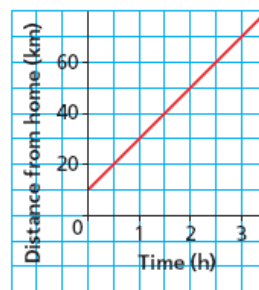
What does the vertical intercept represent?

What does the slope of the line represent?

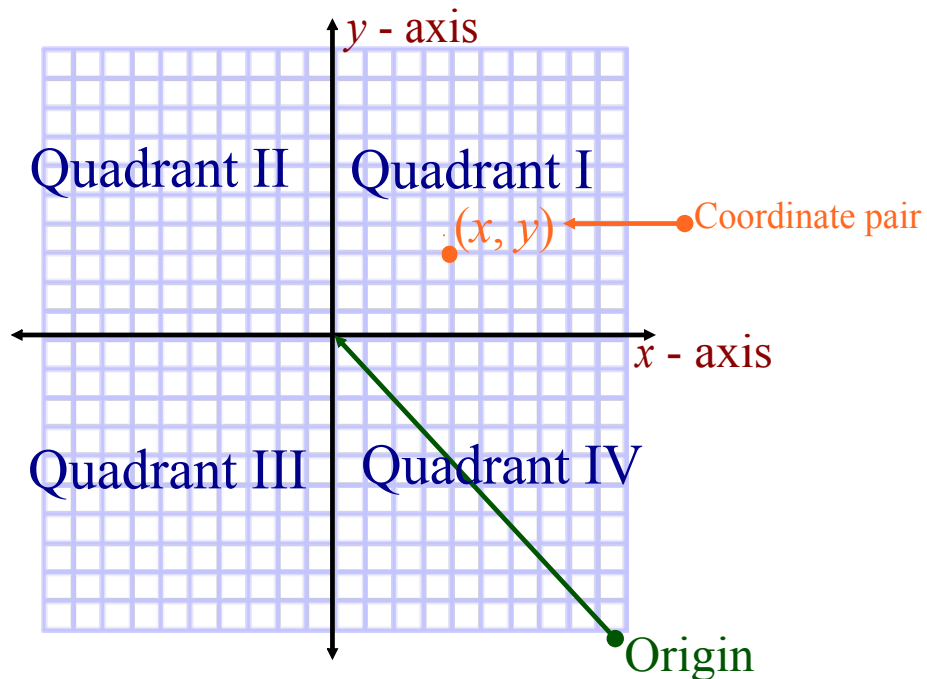
a) distance from home as the start

b)  $\frac{\text{km}}{\text{hr}}$  (speed)

Graph of a Bicycle Journey



## Cartesian Plane



## Finding Intercepts

- x - intercept: - a point where the graph crosses the x-axis.
  - to find the x-intercept  $\Rightarrow$  let  $y = 0$  & solve for  $x$ .
- y - intercept: - a point where the graph crosses the y-axis.
  - to find the y-intercept  $\Rightarrow$  let  $x = 0$  & solve for  $y$ .

**Example:** Find both intercepts given the line...

$$3x - 6y = 12$$

xint let  $y=0$

$$3x - 6(0) = 12$$

$$3x = 12$$

$$x = 4$$

(4, 0)

yint let  $x=0$

$$3(0) - 6y = 12$$

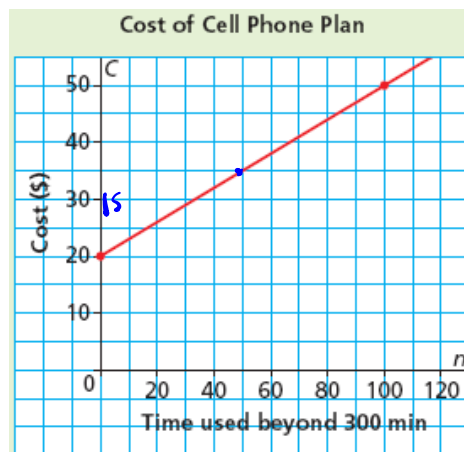
$$-6y = 12$$

$$y = -2$$

(0, -2)

- a) How do you know this is the graph of a linear function?  
 b) What does the slope of the graph represent?

- a)  $m$  is the same  
 b) Cost/min past 300 min



Write an equation to describe this function. Verify that your equation is correct.

$$y = mx + b$$

$\uparrow$   
slope
 $\uparrow$   
y-int

$m = \frac{15}{50}$       $b = 20$

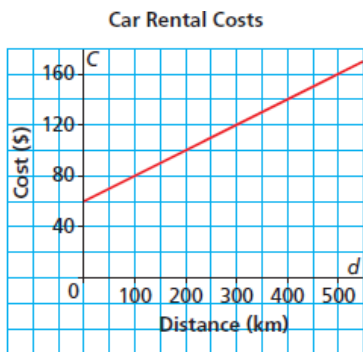
$y = \frac{3}{10}x + 20$

check  $y = \frac{3(100)}{10} + 20$

$$= 30 + 20$$

$$= 50$$

In Chapter 5, Lesson 5.6, we described a linear function in different ways. The linear function below represents the cost of a car rental.



An equation of the function is:

$$C = 0.20d + 60$$

The number 0.20 is the rate of change, or the slope of the graph. This is the cost in dollars for each additional 1 km driven.

The number 60 is ?

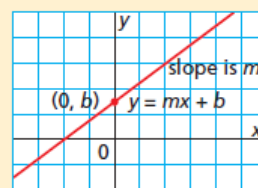
6.4 Slope-Intercept Form of the Equation for a Linear Function

In general, any linear function can be described in slope-intercept form.

**Slope-Intercept Form** of the Equation of a Linear Function

The equation of a linear function can be written in the form  $y = mx + b$ , where  $m$  is the slope of the line and  $b$  is its  $y$ -intercept.

*slope*      *y-int*



6.4 Slope-Intercept Form of the Equation for a Linear Function

**Example 1****Writing an Equation of a Linear Function Given Its Slope and y-Intercept**

The graph of a linear function has slope  $\frac{3}{5}$  and y-intercept  $-4$ .

Write an equation for this function.

$$y = mx + b$$

$$y = \frac{3}{5}x - 4$$

$$Ax + By + C = 0$$

$$5y = 5 \cdot \frac{3}{5}x - 5(4)$$

$$5y = 3x - 20$$

$$-3x + 5y + 20 = 0$$

$$\boxed{3x - 5y - 20 = 0}$$

6.4 Slope-Intercept Form of the Equation for a Linear Function

**YOUR TURN...**

1. The graph of a linear function has slope  $-\frac{7}{3}$  and y-intercept 5.

Write an equation for this function.

$$y = mx + b$$

$$y = -\frac{7}{3}x + 5 \quad \checkmark$$

$$3y = -7x + 15$$

$$\boxed{7x + 3y - 15 = 0}$$

general form

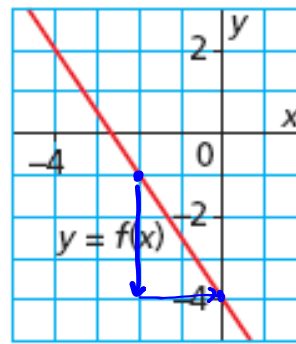
**Example 3**

**Writing the Equation of a Linear Function Given Its Graph**

Write an equation to describe this function.  
Verify the equation.

$$y = mx + b$$

$$y = \frac{-3}{2}x - 4$$



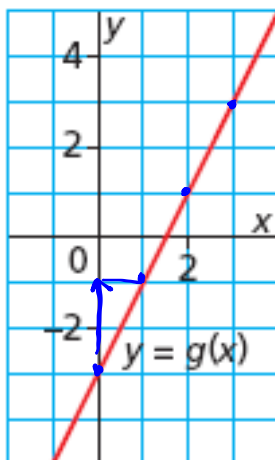
$$m = -\frac{3}{2}$$

$$b = -4$$

6.4 Slope-Intercept Form of the Equation for a Linear Function

**YOUR TURN...**

3. Write an equation to describe this function. Verify the equation.



$$m = \frac{2}{1}$$

$$= 2$$

$$b = -3$$

$$y = mx + b$$

$$y = 2x - 3$$

or

$$2x - y - 3 = 0$$

ex: Determine the **slope** and **y-intercept** of the following line.

$$2(3y - 1) = -2(x + 7)$$

$$6y - 2 = -2x - 14$$

$$6y = -2x - 14 + 2$$

$$\frac{6y}{6} = \frac{-2x}{6} - \frac{12}{6}$$

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

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

$$b = -2$$

$$y = mx + b$$

**EXAMPLE:**

Determine the equation of the line that passes through the points (3, -4) & (0, 4)

$$y = mx + b$$

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

$$= \frac{4 - (-4)}{0 - 3}$$

$$= \frac{8}{-3}$$

$$= -\frac{8}{3}$$

$$y = mx + b$$

$$y = -\frac{8}{3}x + 4$$

(0, 4)  
y.int

## Practice Problems...

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#4, 5, 8, 11, 12, 18, 19, 20