

## 6.6 General Form of the Equation of a Linear Function

### Lesson Focus

Relate the graphs of a linear function to its equation in general form

$$y = mx + b$$

$$y - y_1 = m(x - x_1)$$

# Previous Forms

- **Slope-intercept** form of a linear function contains the **slope** and the **y-intercept**

$$y = mx + b$$

- **Slope-point** form of a linear function contains the **slope** and the **coordinates of a point**

$$y - y_1 = m(x - x_1)$$

# General Form

## General Form of the Equation of a Linear Relation

$Ax + By + C = 0$  is the general form of the equation of a line, where  $A$  is a whole number, and  $B$  and  $C$  are integers.

What is a whole number?  $0, 1, 2, 3, \dots$

What is an integer?  $0, \pm 1, \pm 2, \dots$

*This section is a lot of manipulating formulas!*

# Example

Write each equation in general form.

a)  $(y = -\frac{2}{3}x + 4) \cdot 3$

$$3y = -2x + 12$$

$$2x + 3y - 12 = 0$$

b)  $(y - 1 = \frac{3}{5}(x + 2)) \cdot 5$

$$(y - 1 = \frac{3}{5}x + \frac{6}{5}) \cdot 5$$

$$5y - 5 = 3x + 6$$

$$0 = 3x - 5y + 11$$

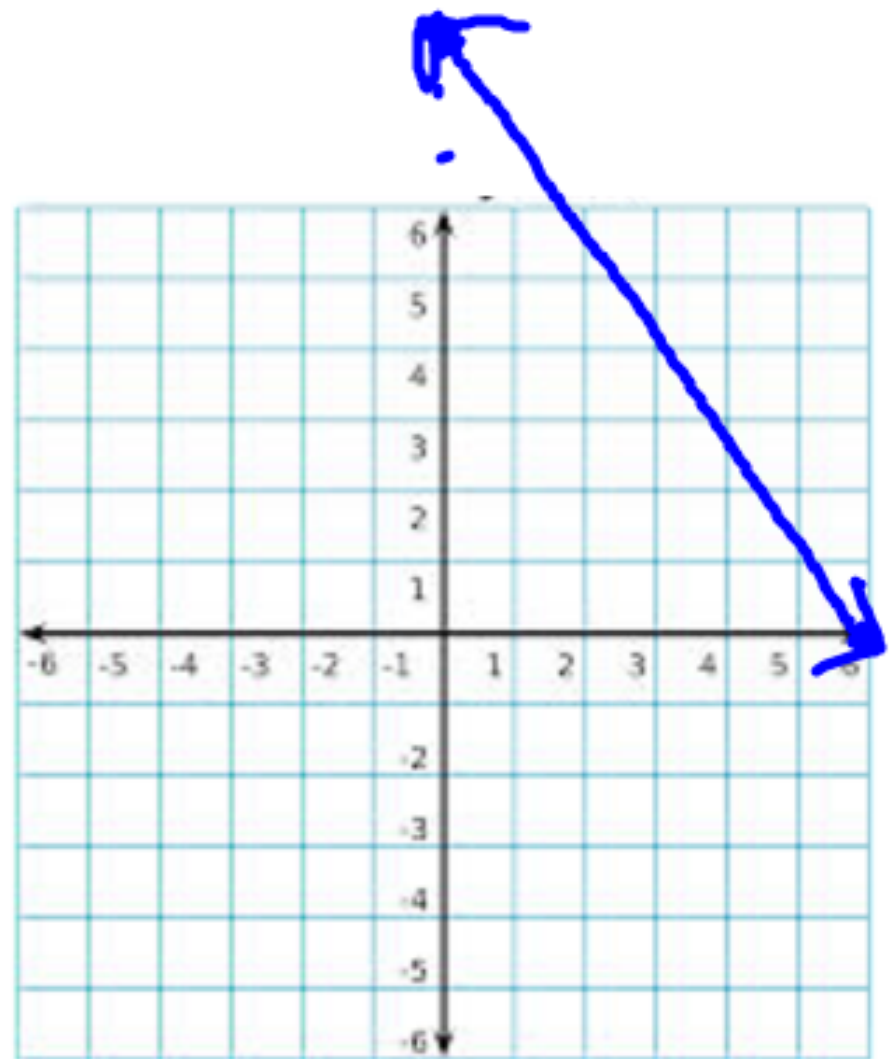
# Example

a) Determine the  $x$ - and  $y$ -intercepts of the line whose equation is:  $3x + 2y - 18 = 0$

b) Graph the line.

c) Verify that the graph is correct.

a) x int  
let  $y = 0$   
 $3x + 2(0) - 18 = 0$   
 $3x - 18 = 0$   
 $\frac{3x}{3} = \frac{18}{3}$   
 $x = 6 \quad (6, 0)$



$$3x + 2y - 18 = 0$$

$$3x + 2y = 18$$

$$\frac{2y}{2} = \frac{-3x}{2} + \frac{18}{2}$$

$$y = -\frac{3}{2}x + 9$$

y int

let  $x=0$

$$3\cancel{0} + 2y - 18 = 0$$

$$2y = 18$$

$$y = 9$$

(0, 9)

## Example

Determine the slope of the line with this equation:

$$3x - 2y - 16 = 0$$

$$y = mx + b$$

$$\frac{-2y}{-2} = \frac{-3x + 16}{-2}$$


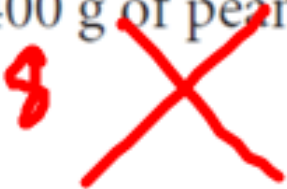
$$y = \frac{3}{2}x - 8$$

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



# Example

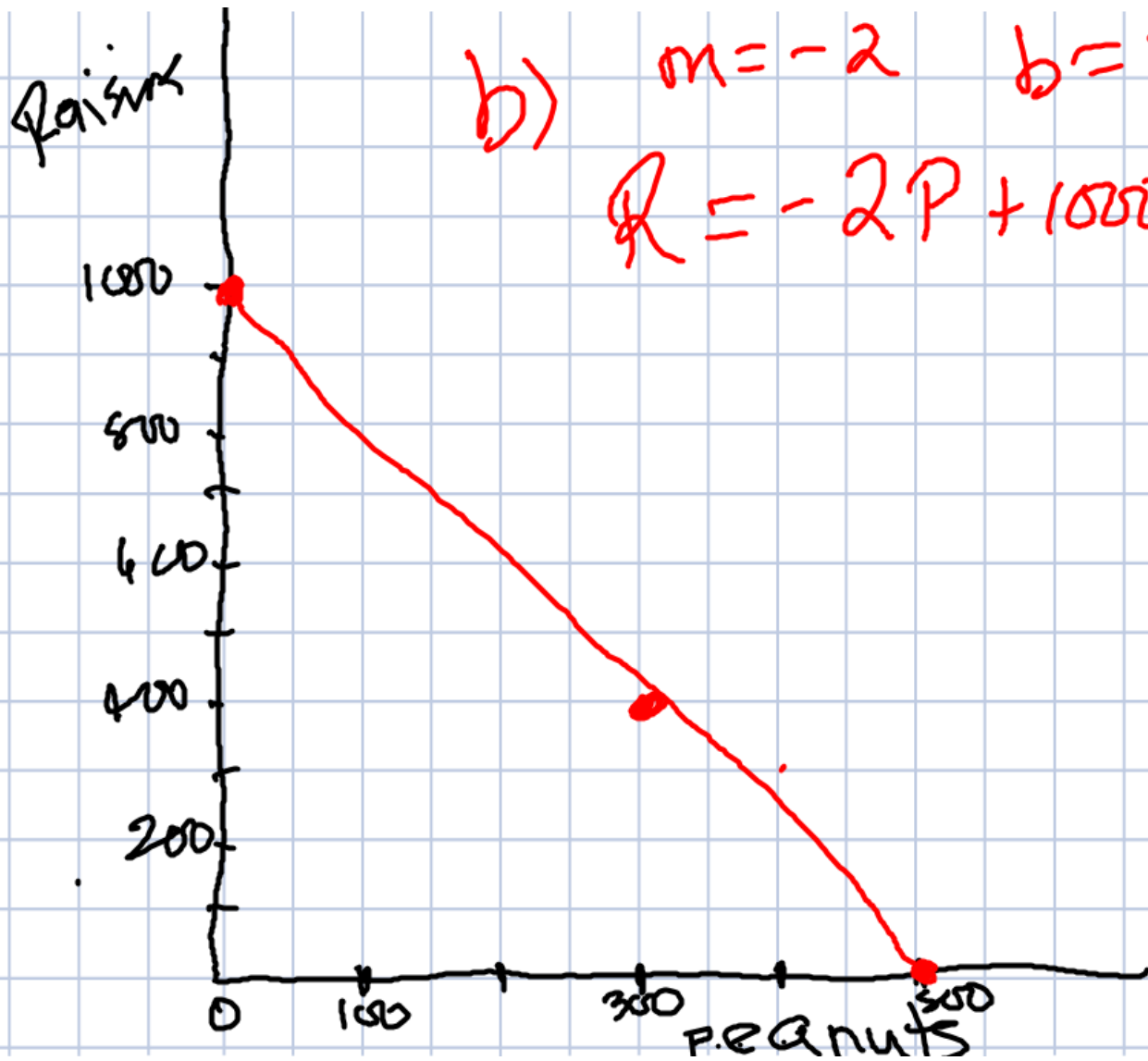
Peanuts cost \$2 per 100 g and raisins cost \$1 per 100 g.  
Devon has \$10 to purchase both these items.

- Generate some data for this relation.
- Graph the data.
- Write an equation for the relation in general form.
- Will Devon spend exactly \$10 if she buys 300 g of peanuts and 400 g of raisins? 
  - Will Devon spend exactly \$10 if she buys 400 g of peanuts and 200 g of raisins? 

Use the graph and the equation to justify the answers.

$\$2/100$   $\$1/100$

P	R
500	0
300	400
0	1000



b)  $m = -2$   $b = 1000$

$$Q = -2P + 1000$$

# Homework

- **P. 383-385**

**# 4, 5, 6, 8, 12, 13, 16, 18, 22**

***for 12 and 13 only do every second letter***

## Chapter 6 Equations

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

$$y = mx + b$$

$$y - y_1 = m(x - x_1)$$

$$Ax + By + C = 0$$