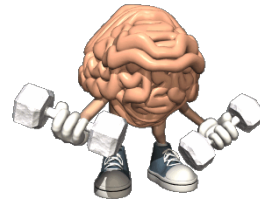


$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{-1 - 2}{3 - (-7)} = \frac{-3}{10}$$

# Warm Up



1) A line that passes through  $(-7, 2)$  and  $(3, -1)$

$x_1, y_1$



$$m = \frac{-3}{10}$$

- a) Write an equation in point slope form:  $y - y_1 = m(x - x_1)$
- b) Write an equation in slope intercept form:  $y = mx + b$
- c) State the x and y intercept

a)

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

$$y - 2 = \frac{-3}{10}(x - (-7))$$

point slope  $y - 2 = \frac{-3}{10}(x + 7)$

↓ fix sign

b)

$$[y - 2] = \left[ \frac{-3}{10}(x + 7) \right] \times 10$$

$$10(y - 2) = -3(x + 7)$$

$$10y - 20 = -3x - 21$$

$$10y - 20 + 20 = -3x - 21 + 20$$

$$10y = -3x - 1$$

$$\frac{10y}{10} = \frac{-3x - 1}{10}$$

$$y = \frac{-3}{10}x - \frac{1}{10}$$

c) y-intercept =  $-\frac{1}{10}$

x-intercept let  $y = 0$

$$\frac{1}{10} + 0 = \frac{-3}{10}x - \frac{1}{10} + \frac{1}{10}$$

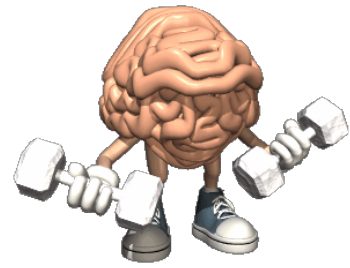
$$\frac{1}{10} = \frac{-3}{10}x$$

$$1 = -3x$$

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

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

# Warm Up



1) A line that passes through  $(-7, 2)$  and  $(3, -1)$

a) Write an equation in point slope form:

b) Write an equation in slope intercept for:

c) State the x and y intercept

## Homework Solutions

$$\begin{aligned}
 1) \quad & y - y_1 = m(x - x_1) \\
 & y - 8 = 2(x - (-1)) \\
 & y - 8 = 2(x + 1) \\
 & y - 8 = 2x + 2 \\
 & y - 8 + 8 = 2x + 2 + 8 \\
 & y = 2x + 10
 \end{aligned}$$

$$\begin{aligned}
 2) \quad & y - y_1 = m(x - x_1) \\
 & y - (-3) = 4(x - 6) \\
 & y + 3 = 4(x - 6) \\
 & y + 3 = 4x - 24 \\
 & y + 3 - 3 = 4x - 24 - 3 \\
 & y = 4x - 27
 \end{aligned}$$

$$\begin{aligned}
 3) \quad & y - y_1 = m(x - x_1) \\
 & y - (-6) = \frac{3}{4}(x - (-1)) \\
 & y + 6 = \frac{3}{4}(x + 1) \\
 & y + 6 = \frac{3x + 3}{4} \\
 & y + 6 - 6 = \frac{3x + 3}{4} - 6 \\
 & y = \frac{3x + 3}{4} - \frac{24}{4} \\
 & y = \frac{3x - 21}{4}
 \end{aligned}$$

$$\begin{aligned}
 4) \quad & y - y_1 = m(x - x_1) \\
 & y - 1 = -3(x - (-1)) \\
 & y - 1 = -3(x + 1) \\
 & y - 1 = -3x - 3 \\
 & y - 1 + 1 = -3x - 3 + 1 \\
 & y = -3x - 2
 \end{aligned}$$

$$\begin{aligned}
 6) \quad & m = \frac{y_2 - y_1}{x_2 - x_1} \\
 & m = \frac{1 - (-2)}{(-4) - (3)} \\
 & m = \frac{1 + 2}{(-4) - (3)} \\
 & m = \frac{3}{-7}
 \end{aligned}$$

$$\begin{aligned}
 & y - y_1 = m(x - x_1) \\
 & y - (-2) = \frac{3}{-7}(x - 3) \\
 & y + 2 = \frac{3(x - 3)}{-7} \\
 & y + 2 = \frac{-3x + 9}{7} \\
 & y + 2 - 2 = \frac{-3x + 9}{7} - 2 \\
 & y = \frac{-3x + 9}{7} - \frac{14}{7} \\
 & y = \frac{-3x - 5}{7}
 \end{aligned}$$

## 6.6 General Form of the Equation for a Linear Relation

### LESSON FOCUS

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

### Make Connections

A softball team may field any combination of 9 female and male players. There must be at least one female and one male on the field at any time. What are the possible combinations for female and male players on the field?



## Linear Equations

**Slope  
Intercept Form**

$$y = mx + b$$

**Point Slope  
Form**

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

## Two other forms of Linear Equations

# Standard

$$Ax + By = C$$

- Where A, B and C are integers

Example:

$$2x + 7y = 10$$

---

# General

$$Ax + By + C = 0$$

### 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.

Example:

$$2x + 7y - 10 = 0$$

$(x, y)$   
 $(-6, +3)$   
 Point - Slope to General Form  $Ax + By + C = 0$

point - slope  
 $y - y_1 = m(x - x_1)$   
 $y - 3 = \frac{2}{5}(x + 6)$

~~Method 1 distribute through~~  
 → Multiply both Sides by denominator

~~$5x[y - 3] = \left[\frac{2}{5}(x + 6)\right] \cdot 5$~~

$5(y - 3) = 2(x + 6)$

$5y - 15 = 2x + 12$   
 ↳ ↳ positive

$5y - 15 = 2x + 12$

$-15 = 2x - 5y + 12$

$0 = 2x - 5y + 27$  General

In doing so the denominator cancels

Multiply through bracket

General form # in front of x has to be positive (Jesse Helena Christine)

# Point - Slope to General Form

Method 2: Get rid of denominator by multiplying each side by denominator

$$y - 3 = \frac{2}{5}(x + 6)$$



You try

# Point - Slope to General Form

$$7x[y + 6] = \left[ \frac{-3}{7}(x - 2) \right] x 7$$

$$7(y+6) = -3(x-2)$$

$$7y + 42 = -3x + 6$$

$$3x + 7y + 42 - 6 = 0$$

$$3x + 7y + 36 = 0$$

some did this

$$-3x - 7y + 6 - 42$$

$$-3x - 7y - 36 = 0$$

↓

# Slope Intercept to General Form

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

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

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

**General Form**  
 $Ax + By + C = 0$

**Slope Intercept**  
 $y = mx + b$

$$7x - 2y + 18 = 0$$

↳                      ↳

$$\frac{-2y}{-2} = \frac{-7x - 18}{-2}$$

$$y = \frac{7}{2}x + 9$$

step 1) Locate y and take it to the side so it is positive

You try

# General Form to Slope Intercept

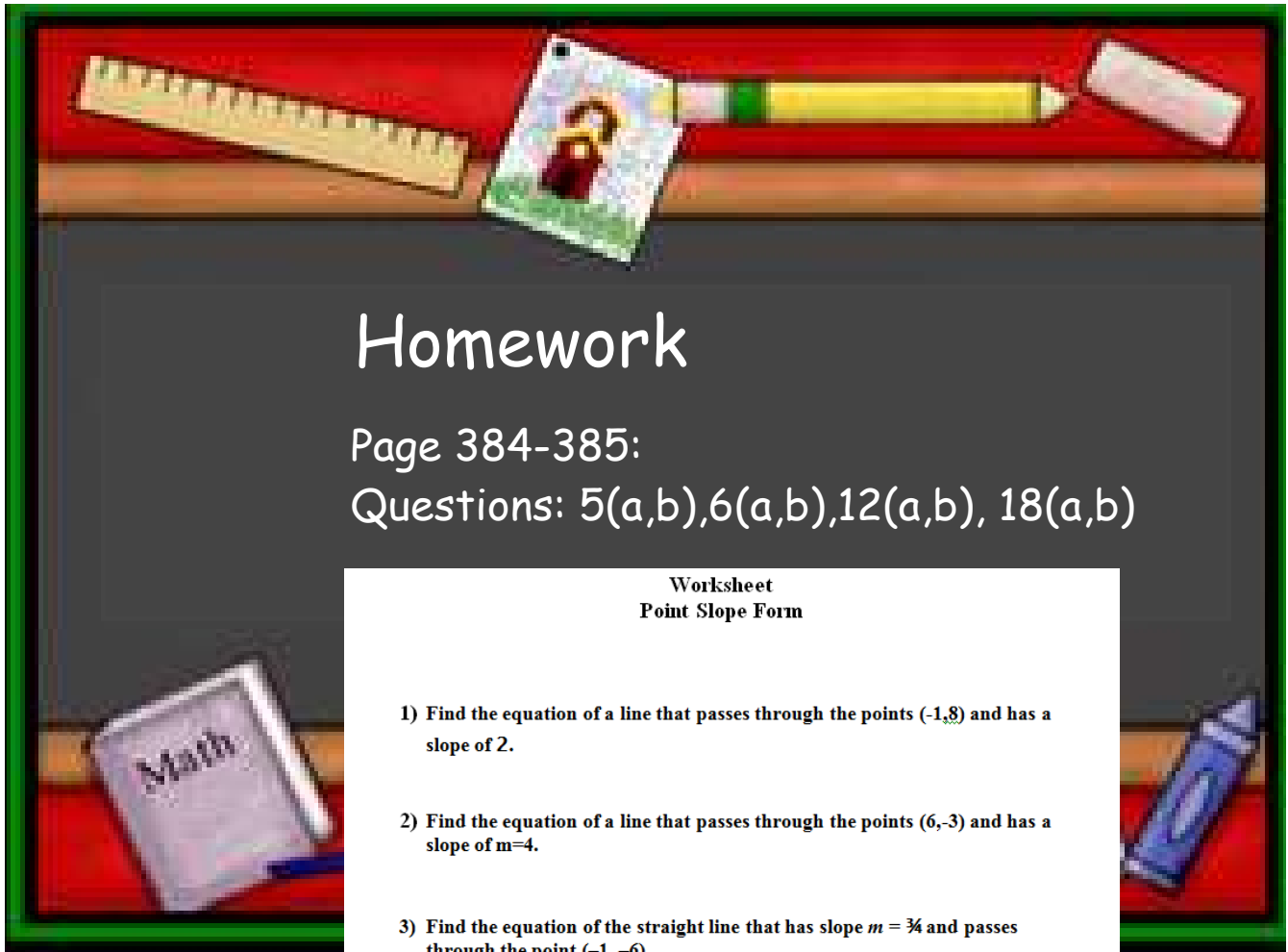
$$y = mx + b$$

$$3x + 4y - 12 = 0$$

*(Handwritten annotations: -3x above 3x, +12 above +4y, -3x above -12, +12 below -12)*

$$\frac{4y}{4} = \frac{-3x + 12}{4}$$

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



# Homework

Page 384-385:

Questions: 5(a,b), 6(a,b), 12(a,b), 18(a,b)

## Worksheet Point Slope Form

- 1) Find the equation of a line that passes through the points  $(-1, 8)$  and has a slope of 2.
- 2) Find the equation of a line that passes through the points  $(6, -3)$  and has a slope of  $m=4$ .
- 3) Find the equation of the straight line that has slope  $m = \frac{3}{4}$  and passes through the point  $(-1, -6)$ .
- 4) Find the equation of a line that passes through  $(-1, 1)$  and has the same slope as  $y = -3x + 4$ .
- 5) Find the equation of a line that passes through  $(-7, 3)$  and has the same slope as  $y = 2x + 1$ .
- 6) Find the equation of a line that passes through the points  $(3, -2)$  and  $(-4, 1)$ .
- 7) ~~Find the equation of a line that passes through the points  $(3, -2)$  and  $(-4, 1)$ .~~
- 8) Find the equation of a line that has the same x-intercept as this equation  $2x + 6 = 3y$ , and also passes through the point  $(4, 5)$ .

New