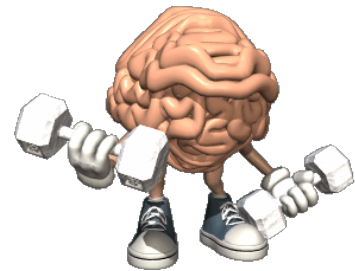


Warm Up



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 form:

Warm Up Solutions

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

- Write an equation in point slope form:
- Write an equation in slope intercept form:
- State the x and y intercept

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

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

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

point $(-7, 2)$

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

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

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

OR distribute through first

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

$$y - 2 = \frac{-3}{10}x - \frac{21}{10}$$

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

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

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

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

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

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

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

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

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

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

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



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:

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

Point - Slope to General Form

Method 1: distribute through

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

$$y - 3 = \frac{2}{5}x + \frac{12}{5}$$

get rid of denominator by multiplying all terms by 5

$$5y - 3 \cdot 5 = \frac{2 \cdot 5}{5}x + \frac{12 \cdot 5}{5}$$

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

\hookrightarrow \hookrightarrow \downarrow
 PK PK

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

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

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

could rearrange this for $y = mx + b$ as well

Point - Slope to General Form

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

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

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

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

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

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

$$0 = 2x - 5y + 15 + 12$$

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

General

You try

Point - Slope to General Form

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

$$y + 6 = \frac{-3}{7} x + \frac{6}{7}$$

$$y + 6 = \frac{-3}{7} x + \frac{6}{7}$$

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

$$\frac{+3x}{7y} + 42 = -3x + 6$$

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

General

Slope Intercept to

General Form

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

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

$$+2x - 12 \quad +2x \quad -12x$$

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

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

General Form

to

Slope Intercept

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

↳ ~ ↳

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

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

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

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

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

You try

General Form to Slope Intercept

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

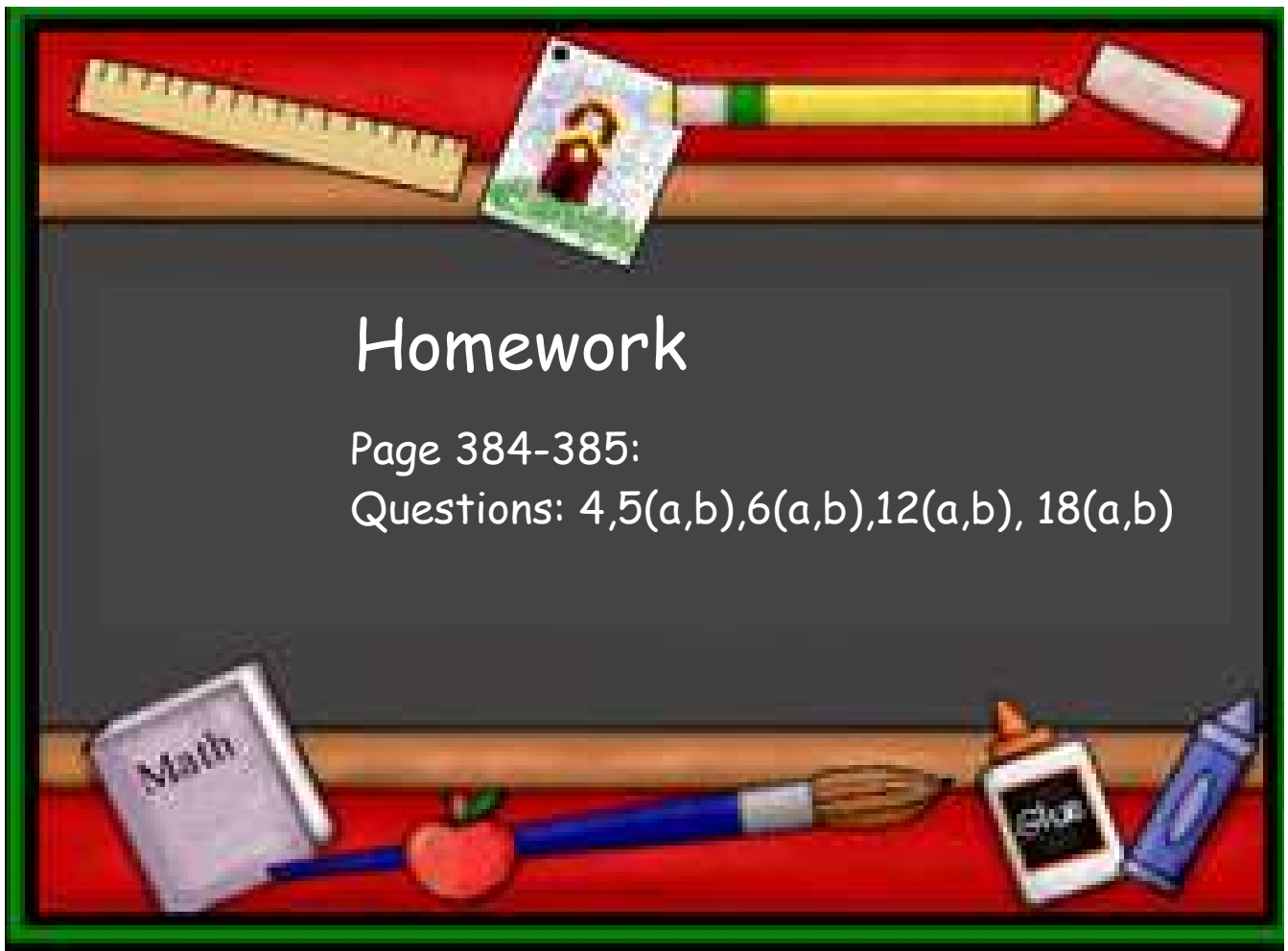
$$\begin{array}{ccc} \hookrightarrow & \sim & \hookrightarrow \\ & & \end{array}$$

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

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

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

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



4. In which form is each equation written?

a) $8x - 3y = 52$ b) $9x + 4y + 21 = 0$

c) $y = 4x + 7$ d) $y - 3 = 5(x + 7)$

5. Determine the x -intercept and the y -intercept for the graph of each equation.

a) $8x - 3y = 24$ b) $7x + 8y = 56$

c) $4x - 11y = 88$ d) $2x - 9y = 27$

6. Write each equation in general form.

a) $4x + 3y = 36$ b) $2x - y = 7$

c) $y = -2x + 6$ d) $y = 5x - 1$

12. Write each equation in slope-intercept form.

a) $4x + 3y - 24 = 0$ b) $3x - 8y + 12 = 0$

c) $2x - 5y - 15 = 0$ d) $7x + 3y + 10 = 0$

18. Write each equation in general form.

a) $y = \frac{1}{3}x - 4$ b) $y - 2 = \frac{1}{3}(x + 5)$

c) $y + 3 = -\frac{1}{4}(x - 1)$ d) $y = -\frac{3}{2}x + \frac{4}{3}$

Solutions to Page 384-385:

Questions: 4,5(a,b),6(a,b),12(a,b), 18(a,b)

4. In which form is each equation written?

★a) $8x - 3y = 52$

Standard

★b) $9x + 4y + 21 = 0$

General

★c) $y = 4x + 7$

Slope Intercept

★d) $y - 3 = 5(x + 7)$

Point Slope

Solutions to Page 384-385:

Questions: 4,5(a,b),6(a,b),12(a,b), 18(a,b)

5. Determine the x -intercept and the y -intercept for the graph of each equation.

$$\star a) 8x - 3y = 24$$

$$\underline{x \text{int}} \rightarrow y=0$$

$$8x - 3(0) = 24$$

$$8x = 24$$

$$x = \frac{24}{8}$$

$$x = 3$$

$$(3, 0)$$

$$y \text{int} \rightarrow x=0$$

$$8(0) - 3y = 24$$

$$-3y = 24$$

$$y = \frac{24}{-3}$$

$$y = -8$$

$$(0, -8)$$

$$\star b) 7x + 8y = 56$$

$$\underline{x \text{int}} \rightarrow y=0$$

$$7x + 8(0) = 56$$

$$7x = 56$$

$$x = \frac{56}{7}$$

$$\boxed{x = 8}$$

$$(8, 0)$$

$$y \text{int} \rightarrow x=0$$

$$7(0) + 8y = 56$$

$$8y = 56$$

$$y = \frac{56}{8}$$

$$y = 7$$

$$(0, 7)$$

$$c) 4x - 11y = 88$$

$$\underline{x \text{ int}} \rightarrow y=0$$

$$4x - 11(0) = 88$$

$$4x = 88$$

$$x = \frac{88}{4}$$

$$x = 22$$

$$(22, 0)$$

$$y \text{ int} \rightarrow x=0$$

$$4(0) - 11y = 88$$

$$-11y = 88$$

$$y = \frac{88}{-11}$$

$$y = -8$$

$$(0, -8)$$

$$d) 2x - 9y = 27$$

$$\underline{x \text{ int}} \rightarrow y=0$$

$$2x - 9(0) = 27$$

$$2x = 27$$

$$x = \frac{27}{2}$$

$$\left(\frac{27}{2}, 0\right)$$

$$y \text{ int} \rightarrow x=0$$

$$2(0) - 9y = 27$$

$$-9y = 27$$

$$y = \frac{27}{-9}$$

$$y = -3$$

$$(0, -3)$$

Solutions to Page 384-385:

Questions: 4,5(a,b),6(a,b),12(a,b), 18(a,b)

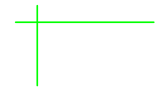
6. Write each equation in general form.

★ a) $4x + 3y = 36$

$4x + 3y - 36 = 0$

★ b) $2x - y = 7$

$2x - y - 7 = 0$



c) $y = -2x + 6$

$2x + y - 6 = 0$

$-2x - y + 6 = 0$

$2x + y - 6 = 0$

d) $y = 5x - 1$

$5x - y - 1 = 0$

Solutions to Page 384-385:

Questions: 4,5(a,b),6(a,b),12(a,b), 18(a,b)

$$y = mx + b$$

12. Write each equation in slope-intercept form.

★ a) $4x + 3y - 24 = 0$

$$3y = -4x + 24$$

$$y = \frac{-4x}{3} + \frac{24}{3}$$

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

★ b) $3x - 8y + 12 = 0$

$$-8y = -3x - 12$$

$$y = \frac{-3}{-8}x - \frac{12}{-8}$$

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

c) $2x - 5y - 15 = 0$

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

$$y = \frac{-2x}{-5} + \frac{15}{-5}$$

$$y = \frac{2}{5}x - 3$$

d) $7x + 3y + 10 = 0$

$$3y = -7x - 10$$

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

Solutions to Page 384-385:

Questions: 4,5(a,b),6(a,b),12(a,b), 18(a,b)

18. Write each equation in general form.

a) $y = \frac{1}{3}x - 4$ b) $y - 2 = \frac{1}{3}(x + 5)$

c) $y + 3 = -\frac{1}{4}(x - 1)$ d) $y = -\frac{3}{2}x + \frac{4}{3}$

★ a) $y = \frac{1}{3}x - 4$

$y = \frac{1}{3}x - 4$

now get rid of denominator by multiplying all terms by that denominator

$3y = x - 12$

x is positive so move all terms to this side

$3y = x - 12$

$0 = x - 3y - 12$

★ b) $y - 2 = \frac{1}{3}(x + 5)$

$y - 2 = \frac{1}{3}x + \frac{5}{3}$

now get rid of denominator by multiplying all terms by that denominator

$y - 2 = \frac{1}{3}x + \frac{5}{3}$

$3y - 6 = 1x + 5$

$3y - 6 = 1x + 5$

x is positive so move all terms to this side

$3y - 6 = 1x + 5$

$0 = 1x - 3y + 11$

18. Write each equation in general form.

a) $y = \frac{1}{3}x - 4$ b) $y - 2 = \frac{1}{3}(x + 5)$

c) $y + 3 = -\frac{1}{4}(x - 1)$ d) $y = -\frac{3}{2}x + \frac{4}{3}$

c) $y + 3 = -\frac{1}{4}(x - 1)$

now get rid of denominator by multiplying all terms by that denominator

$$y + 3 = -\frac{1}{4}x + \frac{1}{4}$$

$$4y + 12 = -1x + 1$$

$$4y + 12 = -1x + 1$$

x is NOT positive so move all terms to other side to make x positive

$$4y + 12 = -1x + 1$$

$$1x + 4y + 11 = 0$$

18)

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

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

now get rid of denominator by multiplying all terms by that common denominator

$$6y = -\frac{18x}{2} + \frac{24}{3}$$

Now divide out the fraction

$$6y = -9x + 8$$



x is NOT positive so move

all terms to other side to make x positive

$$6y = -9x + 8$$

$$9x + 6y - 8 = 0$$