Warm Up
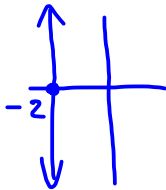
Determine the equation of each of the following lines...
(Express equations in GENERAL FORM)
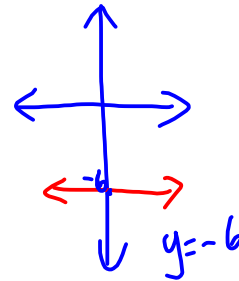
1. perpendicular to the line y = -4x +2 and having y-intercept 3.

$$m = -4$$
$$\perp m = \frac{1}{4}$$

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

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

2. passing through the points (-2, -7) and (-2, 4).

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{-7 - 4}{-2 + 2}$$
$$= \frac{-11}{0}$$

$$x = -2$$
$$x + 2 = 0$$

$$y = -6$$

6.6 General Form of the Equation for a Linear Relation

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.

Features...it is a 'look' NOT a formula!!!

- coefficient in front of x term always positive

- no fractions

- equation set equal to zero

Example 1 Rewriting an Equation in General Form

Write each equation in general form.

a) $\overset{3}{y} = \overset{(13)2}{-\frac{2}{3}}x + \overset{3}{4}$

$3y = -2x + 12$

$2x + 3y - 12 = 0$

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

$5(y-1) = 3(x+2)$

$5y - 5 = 3x + 6$

$3x - 5y + 6 + 5 = 0$

$3x - 5y + 11 = 0$

STEPS...General Form

1) Get rid of fractions
   (Multiply each term by denominator)

2) Get rid of brackets (distribute)

3) Rearrange so x term is positive and equation is equal to zero

6.6 General Form of the Equation for a Linear Relation

YOUR TURN...

CHECK YOUR UNDERSTANDING

1. Write each equation in general form.

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

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

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

$4y = -x + 12$

$x + 4y - 12 = 0$

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

$2(y+2) = 3(x-4)$

$2y + 4 = 3x - 12$

$3x - 2y - 12 - 4 = 0$

$3x - 2y - 16 = 0$

Example 2   Graphing a Line in General Form

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

b) Graph the line.

$3x + 2y - 18 = 0$

X int, let $y = 0$	Y int, let $x = 0$
$3x + 2(0) - 18 = 0$	$3(0) + 2y - 18 = 0$
$\dfrac{3x}{3} = \dfrac{18}{3}$	$\dfrac{2y}{2} = \dfrac{18}{2}$
$x = 6$	$y = 9$
$(6, 0)$	$(0, 9)$
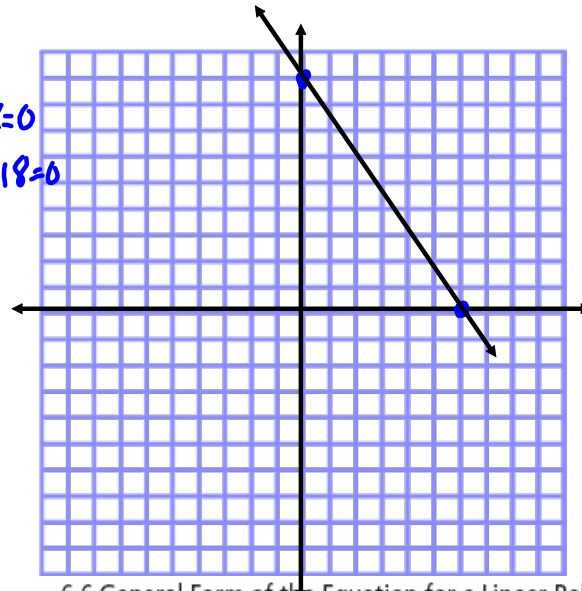
6.6 General Form of the Equation for a Linear Relation

YOUR TURN...

CHECK YOUR UNDERSTANDING

2. a) Determine the x- and y-intercepts of the line whose equation is: $x + 3y + 9 = 0$

b) Graph the line.

c) Verify that the graph is correct.

X int, let $y = 0$ y-int. let $x = 0$

$x + 9 = 0$ $3y + 9 = 0$

$x = -9$ $\dfrac{3y}{3} = \dfrac{-9}{3}$

$(-9, 0)$ $y = -3$

$(0, -3)$

c) let $x = -3$

$-3 + 3y + 9 = 0$

$3y + 6 = 0$

$\dfrac{3y}{3} = \dfrac{-6}{3}$ $(-3, -2)$ ✓

$y = -2$

3
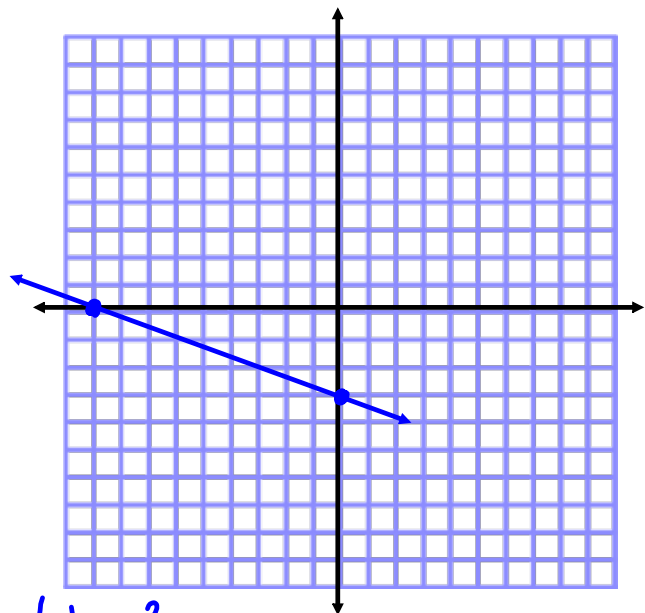
Example 3 — Determining the Slope of a Line Given Its Equation in General Form

Determine the slope of the line with this equation:

$3x - 2y - 16 = 0$

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

$$y = \left(\frac{3}{2}\right)x - 8$$

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

6.6 General Form of the Equation for a Linear Relation

YOUR TURN...

CHECK YOUR UNDERSTANDING

3. Determine the slope of the line with this equation:
$5x - 2y + 12 = 0$

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

$$y = \frac{5}{2}x + 6$$

$$m = \frac{5}{2}$$

4 forms of the linear equation...

1) Slope-Intercept Form
$$y = mx + b$$

2) Slope-Point Form
$$y - y_1 = m\left(x - x_1\right)$$

3) General Form
$$Ax + By + C = 0$$

4) Standard Form
$$Ax + By = C$$

Practice Problems...

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