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.

FORMS of a linear equation ...

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

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

③ $Ax + By = C$ (Standard Form)

④ $Ax + By + C = 0$ (General Form)

Example 1   Rewriting an Equation in General Form

Write each equation in general form.

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

(3) (3)

① No Fractions !!

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

$2x + 3y - 12 = 0$

② "X" is now positive & set $= 0$

6.6 General Form of the Equation for a Linear Relation

(5) (5) (5)

$y - 1 = \dfrac{3}{5}(x + 2)$

$5y - 5 = 3x + 6$

$\boxed{0 = 3x - 5y + 11}$

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

Determine the slope of the line with this equation:

$3x - 2y - 16 = 0$

switch to $y = mx + b$

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

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

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

$$y\text{-Int.} = ^{-}8$$

6.6 General Form of the Equation for a Linear Relation

Express in slope-y-intercept, standard and general form . . .

$$y + 7 = \frac{-3}{5}(x - 4) \quad \longleftarrow \text{Point-Slope}$$

$$5y + 35 = -3x + 12$$

$$\boxed{3x + 5y = -23} \quad \longleftarrow \text{standard}$$

$$\boxed{3x + 5y + 23 = 0} \quad \longleftarrow \text{general}$$

$$5y = -3x - 23$$

$$\boxed{y = -\frac{3}{5}x - \frac{23}{5}} \quad \longleftarrow \text{Slope y-Intercept}$$

Check Up

Determine the equation of each of the following lines...

(Express equations in GENERAL FORM)

1. passing through the ordered pair (-2, 3) and with slope 5

2. passing through the ordered pairs (6, -1) and (0, -3)

3. passing through the point (1, 2) and parallel to the line 2x - 5y +1 =0

4. perpendicular to the line y = -4x +2 and having y-intercept 3.

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

1. passing through the ordered pair (-2, 3) and with slope 5

$$y - y_1 = m(x - x_1)$$
$$y - 3 = 5(x + 2)$$
$$y - 3 = 5x + 10$$
$$\boxed{0 = 5x - y + 13}$$

2. passing through the ordered pairs (6, -1) and (0, -3)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$m = \frac{-3 - (-1)}{0 - 6}$$
$$m = \frac{-2}{-6}$$
$$m = \frac{1}{3}$$

$$y = mx + b$$
$$-1 = \frac{1}{3}(6) + b$$
$$-1 = 2 + b$$
$$-3 = b$$
$$(3)y = \frac{1}{3}x - 3(3)$$
$$3y = x - 9$$
$$\boxed{0 = x - 3y - 9}$$

3. passing through the point (1, 2) and parallel to the line 2x - 5y +1 =0

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

$$\xi(x,y)$$

Ans: $2x - 5y + 8 = 0$

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

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

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

$$5y - 10 = 2x - 2$$

$$\boxed{0 = 2x - 5y + 8}$$

4. perpendicular to the line y = -4x +2 and having y-intercept 3.
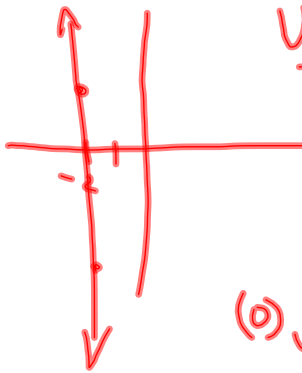
$$M = -4$$

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

$$\boxed{\frac{1}{4} m = \frac{1}{4}}$$

$$(0,3)$$

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

$$4y = x + 12$$

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

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

Vertical Line:

$$x = -2$$

$$m = \frac{4 - (-7)}{-2 - (-2)}$$

$$m = \frac{11}{0} \leftarrow \text{uh oh!!}$$

$$(0) \, y + 7 = \frac{11}{0}(x + 2)$$

$$0 = 11x + 22$$

$$\frac{-22}{11} = \frac{11x}{11}$$

$$\boxed{-2 = x}$$

$$\boxed{x + 2 = 0}$$

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Homework: Finding equation of line worksheet

Attachments

Worksheet - Solving Exponential Equations.doc