

MATH 10 - UNIT 7 - LESSON 6 - EQUATION OF A LINE IN GENERAL FORM

CO-ORDINATE GEOMETRY UNIT

Name: key Block: _____ Date: _____

Let's Review!

$m = -2$
 $b = 6$

1. Write the equation of a line in slope-intercept form with a slope of -2 and a y-intercept of 6.

$$y = mx + b$$

$$y = -2x + 6$$

2. Write the equation of a line in slope-point form with a slope of $\frac{1}{2}$, that passes through the point (5, 8).

$m = \frac{1}{2}$
 $(5, 8)$
 x_1, y_1

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

$$y - 8 = \frac{1}{2}(x - 5)$$

Equation of a Line in General Form

$$Ax + By + C = 0$$

where A is a whole number and B, and C are integers.

Examples:

$$2x + 7y - 4 = 0$$

$$3x - 2y + 8 = 0$$

↑ coefficient of x must be +ve

Example: Rewrite the following equations in general form.

* Get rid of fraction, then move everything to one side.

1. $y = -\frac{3}{2}x + 6$

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

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

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

2. $y - 6 = \frac{1}{4}(x + 4)$

$$4(y - 6) = 4 \times \frac{1}{4}(x + 4)$$

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

$$0 = x - 4y + 4 + 24$$

$$0 = x - 4y + 28$$

$$x - 4y + 28 = 0$$

Try it! Rewrite the following equations in general form.

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

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

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

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

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

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

$$5y + 10 = 2(x - 2)$$

$$5y + 10 = 2x - 4$$

$$0 = 2x - 5y - 4 - 10$$

$$0 = 2x - 5y - 14$$

$$2x - 5y - 14 = 0$$

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Graphing a Line in General Form

Find the x -intercept by setting $y = 0$. Find the y -intercept by setting $x = 0$. You have two points, so you can graph your line!

Example: Graph the following lines.

1. $2x - 4y + 3 = 0$

#1 Find x -intercept ($y=0$)

$$2x - 4(0) + 3 = 0$$

$$2x + 3 = 0$$

$$2x = -3$$

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

$$x = -1.5$$

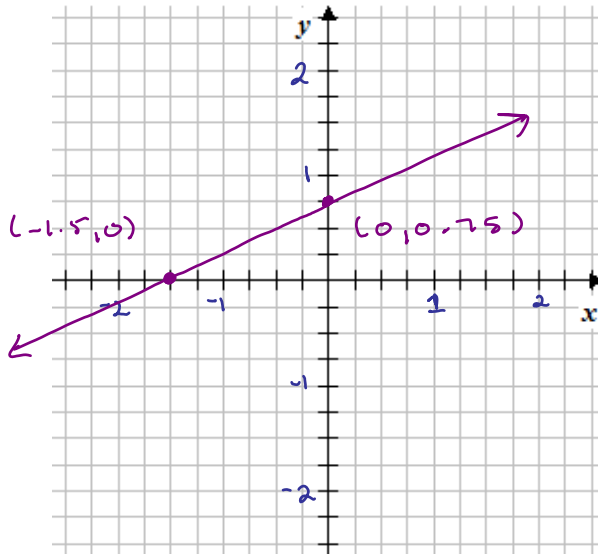
#2 Find y -intercept ($x=0$)

$$2(0) - 4y + 3 = 0$$

$$-4y + 3 = 0$$

$$\frac{3}{4} = \frac{4y}{4}$$

$$\frac{3}{4} = y \text{ or } y = 0.75$$



2. $3x + 6y - 1 = 0$

#1 Find x -intercept ($y=0$)

$$3x + 6(0) - 1 = 0$$

$$3x - 1 = 0$$

$$3x = 1$$

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

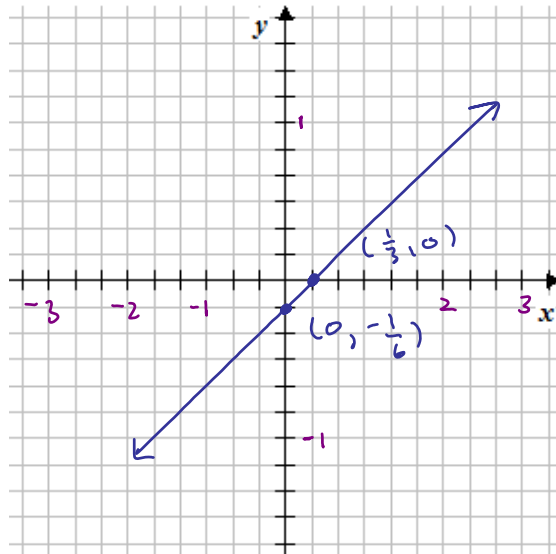
#2 Find y -intercept ($x=0$)

$$3(0) + 6y - 1 = 0$$

$$6y - 1 = 0$$

$$-1 = \frac{6y}{6}$$

$$-\frac{1}{6} = y$$



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Finding the Slope of the Line

To find the slope of a line written in general form, rewrite the equation in slope-intercept form.

Put into $y = mx + b$ form. (solve for y)

Example: Determine the slope of the following lines.

1. $2x - 3y - 3 = 0$

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

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

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

\therefore the slope is $\frac{2}{3}$

2. $4x + 2y - 5 = 0$

$$\frac{2y}{2} = \frac{-4x + 5}{2}$$

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

\therefore the slope is -2

Try it! Determine the slope of the following lines.

1. $3x - 2y + 8 = 0$

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

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

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

\therefore the slope is $\frac{3}{2}$

2. $5x + 3y - 9 = 0$

$$\frac{3y}{3} = \frac{-5x + 9}{3}$$

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

\therefore the slope is $-\frac{5}{3}$