Math 1201

6.6A General Form of the Equation for a Linear Function

General Form

$$Ax + By + C = 0$$

where A is a whole number and should not be negative, and B and C are integers.

Standard Form
Standard form is closely related to General Form. The only difference is C has been moved to the right hand side to get:

$$Ax + By = -C$$

Example 1:
Change $3x - 4y - 7 = 0$ to standard form.

$3x - 4y = 7$

Determining the x and y-intercepts of a Linear Function Written in General Form

A nice feature of general form is that it allows us to fairly quickly and easily determine the x and y-intercepts of a linear function.

Steps:
At the y-intercept on a graph, $x = 0$. At the x-intercept, $y = 0$. Thus:

- To find the y-intercept, set $x = 0$ and solve for y.
- To find the x-intercept, set $y = 0$ and solve for x.

Example 2:

(A) Determine the x and y-intercepts of the function

$$2x + 4y - 16 = 0$$

x-intercept: $y = 0$

$2x + 4(0) - 16 = 0$

$2x = 16$

$\frac{2x}{2} = \frac{16}{2}$

$x = 8$ $(8, 0)$

y-intercept: $x = 0$

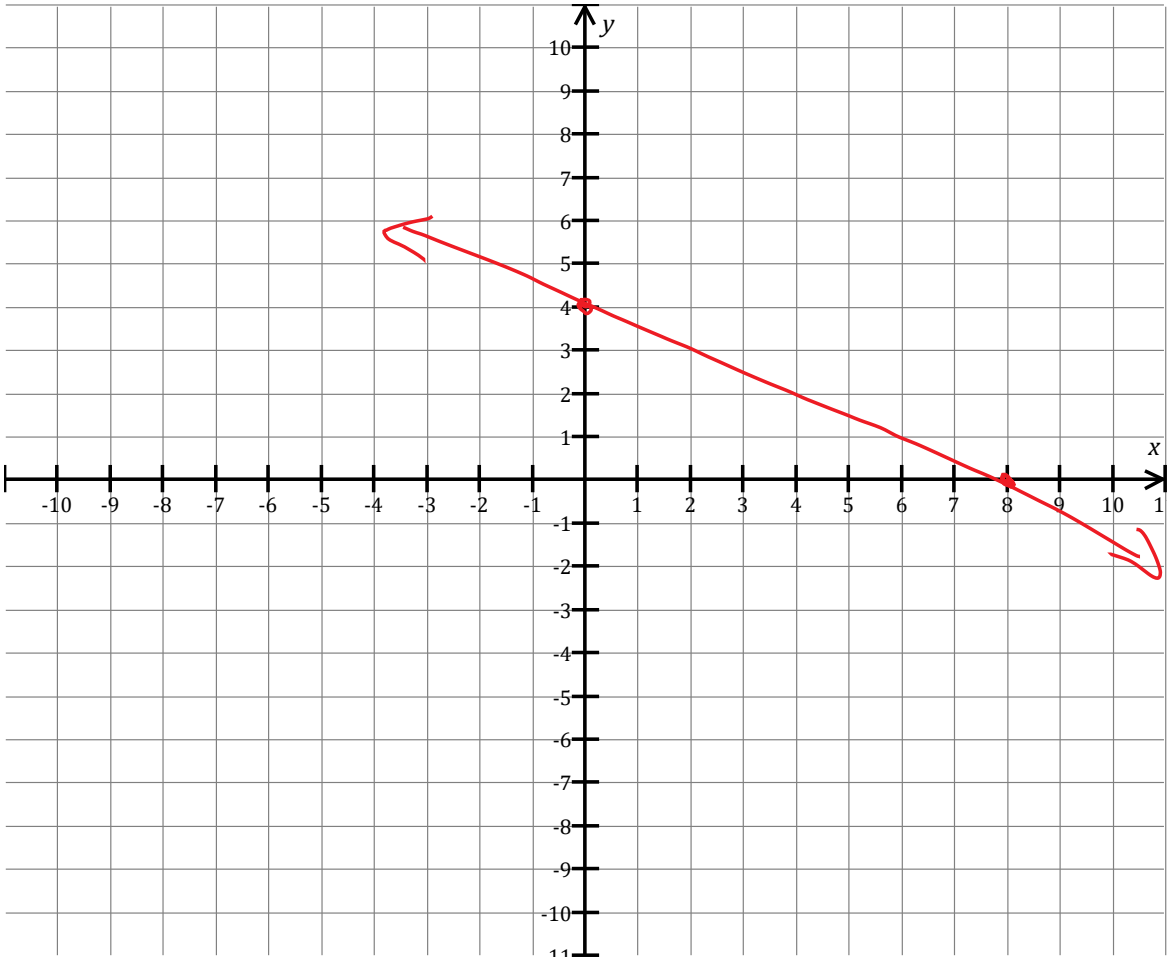
$2(0) + 4y - 16 = 0$

$4y = 16$

$\frac{4y}{4} = \frac{16}{4}$

$y = 4$ $(0, 4)$

(B) Graph the function:



Determining the Slope and y-intercept of a Linear Function Written in General Form

To determine the slope and y-intercept of an equation written in general form, we can rewrite the equation in slope intercept form.

Example 3: Write the following in slope - intercept form. $y = mx + b$

(A) $2x + 4y - 16 = 0$

$4y = -2x + 16$

$\frac{4y}{4} = \frac{-2x}{4} + \frac{16}{4}$

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

$m = -\frac{1}{2}$

$b = 4$

(B) $8x + 5y + 20 = 0$

$5y = -8x - 20$

$\frac{5y}{5} = -\frac{8x}{5} - \frac{20}{5}$

$y = -\frac{8}{5}x - 4$

$m = -\frac{8}{5}$

$b = -4$

(C) $2x + 3y - 12 = 0$

$3y = -2x + 12$

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

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

Your turn:

1. Determine the x and y-intercepts of each equation and then graph each function:

(A) $4x - 12y + 16 = 0$

x-intercept: $y = 0$

$4x - 12(0) + 16 = 0$

$4x = -16$

$\frac{4x}{4} = \frac{-16}{4}$

$x = -4$ $(-4, 0)$

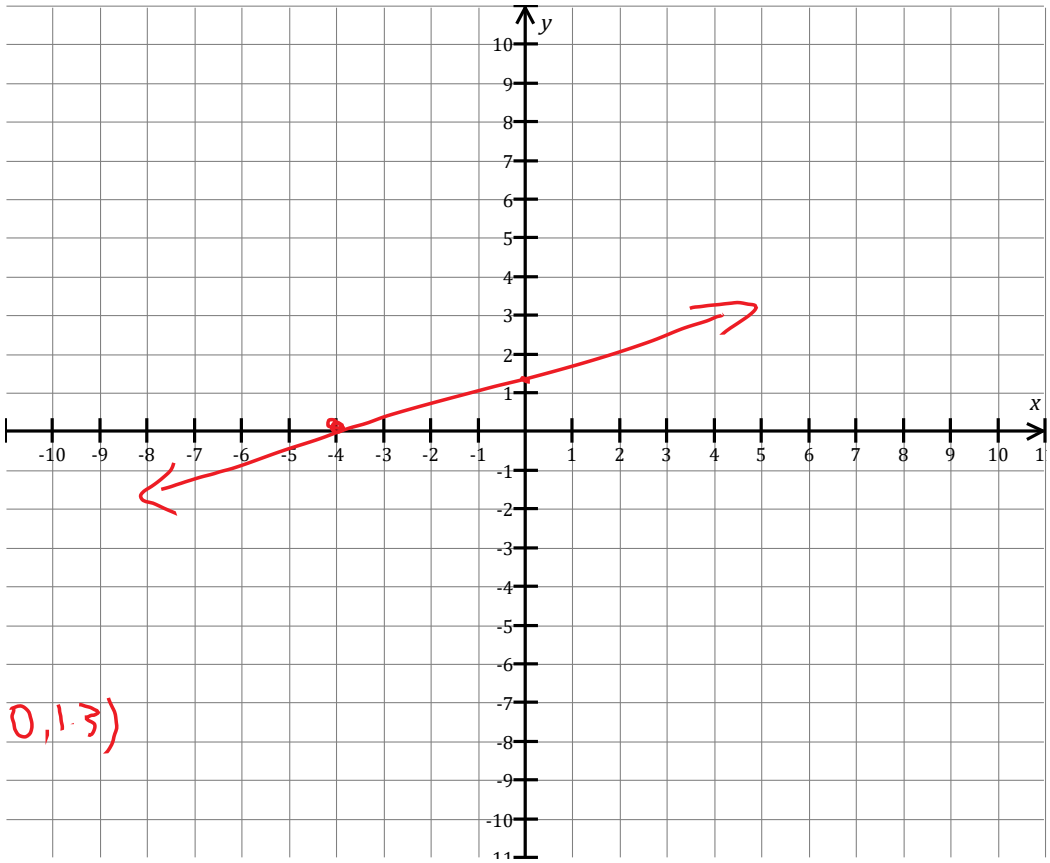
y-intercept: $x = 0$

$4(0) - 12y + 16 = 0$

$-12y = -16$

$\frac{-12y}{-12} = \frac{-16}{-12}$

$y = \frac{4}{3} \sim 1.3$ $(0, 1.3)$



(B) $3x + 4y + 8 = 0$

y-intercept: $y = 0$

$3x + 4(0) + 8 = 0$

$3x = -8$

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

$x = -2.7$ $(-2.7, 0)$

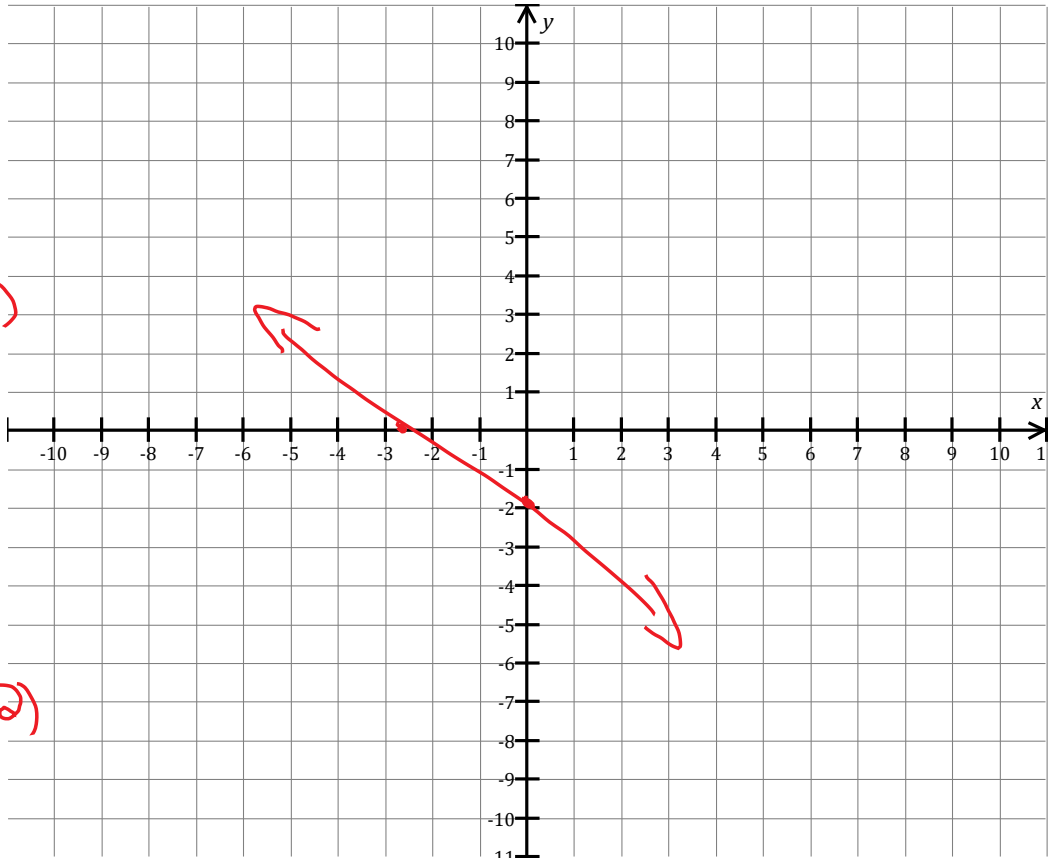
x-intercept: $y = 0$

$2(0) + 4y + 8 = 0$

$4y = -8$

$\frac{4y}{4} = \frac{-8}{4}$

$y = -2$ $(0, -2)$



2. Write the following in slope-intercept form, and state the values of the slope and y-intercept.

(A) $4x + 2y - 10 = 0$

$2y = -4x + 10$

$\frac{2y}{2} = \frac{-4x}{2} + \frac{10}{2}$

$y = -2x + 5$

$m = -2$

$b = 5$

(B) $3x - 9y + 10 = 0$

$-9y = -3x - 10$

$\frac{-9y}{-9} = \frac{-3x}{-9} - \frac{10}{-9}$

$y = \frac{1}{3}x + \frac{10}{9}$

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

$b = \frac{10}{9}$

(C) $10x - 5y - 25 = 0$

$-5y = -10x + 25$

$\frac{-5y}{-5} = \frac{-10x}{-5} + \frac{25}{-5}$

$y = 2x - 5$

$m = 2$

$b = -5$

Textbook Questions: page 384, #4, 5, 7, 9, 12, 13, 14, 22