6.2 - Standard Form

The equation of a line can be written in two different forms:

1. Slope y-intercept form: $y = mx + b$

where m is the slope, and b is the y-intercept

2. Standard form: $Ax + By + c = 0$

where $A, B,$ and c are __integers__ and A and B are both not
__zero__.

You can change an equation from one form to the other by rearranging the equation.

Example 1:
Write the equation of the line $2x - 3y - 6 = 0$ in slope y-intercept form by isolating the y.

$$2x - 3y - 6 = 0$$

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

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

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

Example 2:
Write each equation in slope y-intercept form and state the slope and the y-intercept.

a) $3x + 5y - 15 = 0$

$$\frac{5y}{5} = \frac{-3x + 15}{5}$$

$$y = \frac{-3}{5}x + \frac{15}{5}$$

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

$$\text{Slope} = m = \frac{-3}{5}$$

$$\text{y-intercept} = b = 3$$

b) $7x - 3y + 21 = 0$

$$-3y = -7x - 21$$
$$\frac{-3y}{-3} = \frac{-7x - 21}{-3}$$

$$y = \frac{-7}{-3}x - \frac{21}{-3}$$

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

Slope $= m = \frac{7}{3}$

y-intercept $= b = 7$

Example 3: Barney's Banquet Facility charges according to the equation $2x - y + 200 = 0$ where x is the number of people attending and y is the total cost.

a) Write the equation in slope y-intercept form.

$$2x - y + 200 = 0$$
$$2x + 200 = y$$
$$y = 2x + 200$$

b) What is the fixed cost?

fixed cost $= b = 200$

$\$200$

c) What is the rate of change of the cost?

rate of change $= m = 2$

$\$2$ per person

d) What is the total cost if 125 people attend a banquet at Barney's?

$y = 2(125) + 200$

$y = 250 + 200$

$y = 450$

$\boxed{\$450}$

e) If the total cost is $920, how many people attend the banquet?

$920 = 2x + 200$

$920 - 200 = 2x$

$\dfrac{720}{2} = \dfrac{2x}{2}$

$\dfrac{720}{2} = x$

$x = 360$

$\boxed{360 \text{ people}}$

1. There are two forms in which the equation of a line can be written. What are they?

Slope y-intercept form: $y = mx + b$

standard form: $Ax + By + c = 0$

2. It is possible to convert an equation from one form to the other by __Rearranging__ the equation.

3. Write the slope-intercept form of the equation of each line:

a) $3x - 2y = -16$

$-2y = -3x - 16$

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

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

b) $13x - 11y = -12$

$-11y = -13x - 12$

$y = \frac{-13}{-11}x - \frac{12}{-11}$

$y = \frac{13}{11}x + \frac{12}{11}$

c) $9x - 7y = -7$

$-7y = -9x - 7$

$y = \frac{-9}{-7}x - \frac{7}{-7}$

$y = \frac{9}{7}x + 1$

d) $x - 3y = 6$

$-3y = -1x + 6$

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

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

e) $6x + 5y = -15$

$5y = -6x - 15$

$y = \frac{-6}{5}x - \frac{15}{5}$

$y = -\frac{6}{5}x - 3$

f) $4x - y = 1$

$4x - 1 = y$

$y = 4x - 1$

g) $11x - 4y = 32$

$-4y = -11x + 32$

$y = \frac{-11}{-4}x + \frac{32}{-4}$

$y = \frac{11}{4}x - 8$

h) $11x - 8y = -48$

$-8y = -11x - 48$

$y = \frac{-11}{-8}x - \frac{48}{-8}$

$y = \frac{11}{8}x + 6$