Slope y-Intercept Form

$y = mx + b$

Slope: m y-Intercept: b

ex. $y = 3x - 7$

Slope = 3

y-Int. = -7

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Intercepts

* x-Intercept (Sub. $y = 0$)

y-Intercept: (Sub. $x = 0$)

$\Rightarrow$ Rearrange equation into $y = mx + b$

YOUR TURN...

1. Determine the slope, the x intercept and the y intercept of the following line...

$$6x - 3y + 9 = 0$$

$m = 2$
$x\text{-Int.} = -\frac{3}{2}$
$y\text{-Int.} = 3$

2. Determine the equation for each of the following lines...
Put the equation in the **slope - y intercept form**.

a) passes through the points (-4, 6) & (0, -8).

$y = mx + b$

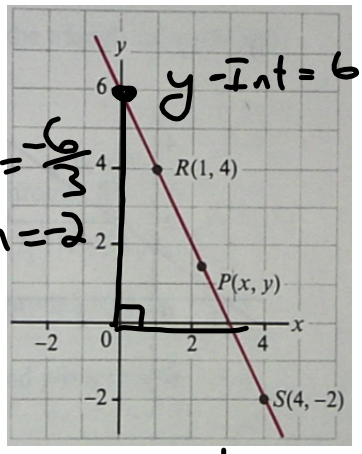
$y = -\frac{7}{2}x - 8$

slope, y-Int.

$b = -8$

$m = \frac{-8-6}{0-(-4)} = \frac{-14}{4} = -\frac{7}{2}$

b)



$y = mx + b$

$y = -2x + 6$

1. $6x - 3y + 9 = 0$

$\frac{6x}{3} + \frac{9}{3} = \frac{3y}{3}$

$2x + 3 = y$

$y = 2x + 3$

$m = 2$ $y\text{-Int.} = 3$

Slope

$(y = mx + b)$

x-Int.

$6x - 0 + 9 = 0$

$\frac{6x}{6} = -\frac{9}{6}$

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

y-Int.

$0 - 3y + 9 = 0$

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

$y = 3$

6.5 Slope-Point Form of the Equation for a Linear Function

LESSON FOCUS Relate the graph of a linear function to its equation in slope-point form.

Make Connections

This graph shows the height of a candle as it burns.
How would you write an equation to describe this line?
Suppose you could not identify the h-intercept.
How could you write an equation for the line?

$y = -\frac{1}{3}x + 30$

slope $= \frac{-10}{30} = -\frac{1}{3}$

(20, 10)

10 | $-\frac{1}{3}(20) + 30$

CS ≠ RS

Not on Line

(60, 10)

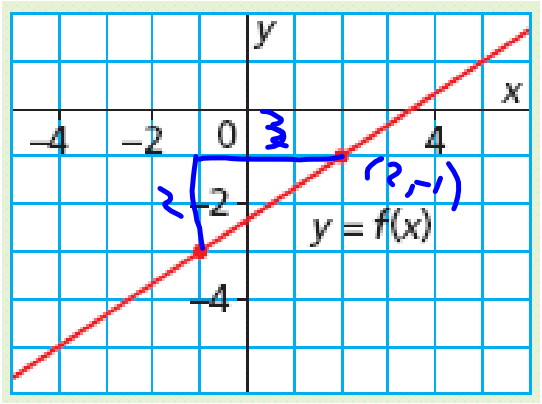
10 | $-\frac{1}{3}(60) + 30$

$-20 + 30$

10

CS = RS

How about this one using y = mx + b?



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

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

$(3)\ -1 = \frac{2}{3}(2) + b(3)$

$-1 = \frac{2}{3}\left(\frac{2}{1}\right) + b$

$-1 = \frac{4}{3} + b$

$-1 - \frac{4}{3} = b$

$-\frac{3}{3} - \frac{4}{3} = b$

$-\frac{7}{3} = b$

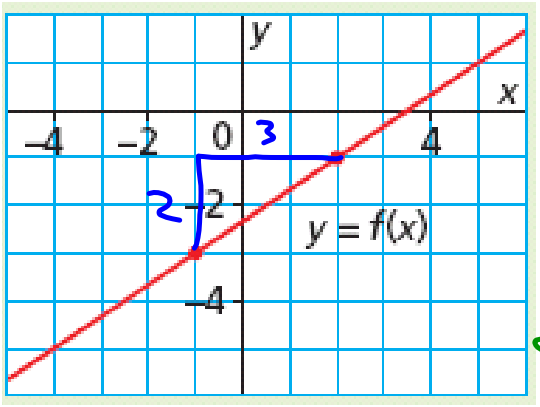
$-3 = 4 + 3b$

$-3 - 4 = 3b$

$-\frac{7}{3} = \frac{3b}{3}$

$-\frac{7}{3} = b$

$y = \frac{2}{3}x - \frac{7}{3}$



Slope-Point Form

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

Sub. slope of the line

Substitute coordinates of ANY point on line

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$y_2 - y_1 = m(x_2 - x_1)$

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

$(-4, -5)$

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

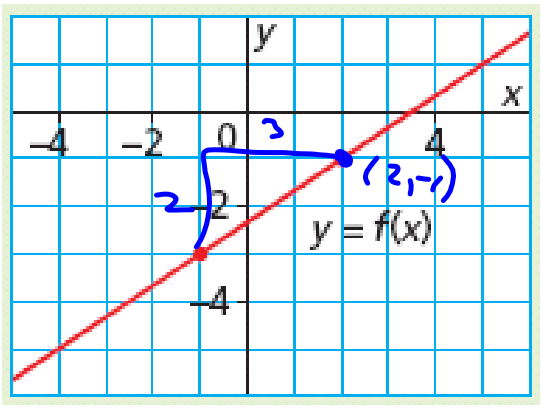
$y - (-5) = \frac{2}{3}(x - (-4))$

$y + 5 = \frac{2}{3}(x + 4)$

$y = \frac{2}{3}x + \frac{8}{3} - 5$

$y = \frac{2}{3}x + \frac{8}{3} - \frac{15}{3}$

$y = \frac{2}{3}x - \frac{7}{3}$



Method 3 (Slope)

$m = \frac{y_2 - y_1}{x_2 - x_1}$

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

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

$2x - 4 = 3y + 3$

$2x - 4 - 3 = 3y$

$\frac{2x}{3} - \frac{7}{3} = \frac{3y}{3}$

$y = \frac{2}{3}x - \frac{7}{3}$

Slope - Point Formula... (0,6)

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

YOU NEED... 1) slope & 2) a point on the line

EXAMPLE #3:

Determine the equation of the line that passes through (-1, 4) & (3, -12).

↖ Need 1 Point & Slope

$m = \frac{-12-4}{3-(-1)}$

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

$m = -4$

Slope formula

$m = \frac{y-y_1}{x-x_1}$

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

$-4(x+1) = y-4$

$-4x-4 = y-4$

$y = -4x-4+4$

$y = -4x$

Slope-Point

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

$y-(-12) = -4(x-3)$

$y+12 = -4x+12$

$y = -4x+12-12$

$y = -4x$

$m = -4$

$(-1, 4)$

$y = mx+b$

$4 = -4(-1)+b$

$4 = 4+b$

$0 = b$

$y = -4x+0$

Passing through (7, -2) & (5, 1)

" Done using ALL 3 strategies "