# Sec. 5.3 Slope-Intercept Form

## Slope-Intercept Form

$$y = mx + b$$

$m$: slope; $b$: y-intercept

**Problem 1:**

What are the slope and y-intercept of the graph of

$$y = 3x - 6$$

slope: 3

y-intercept: $-6$

**Problem 2:**

What is an equation of the line with slope 5 and y-intercept 8?

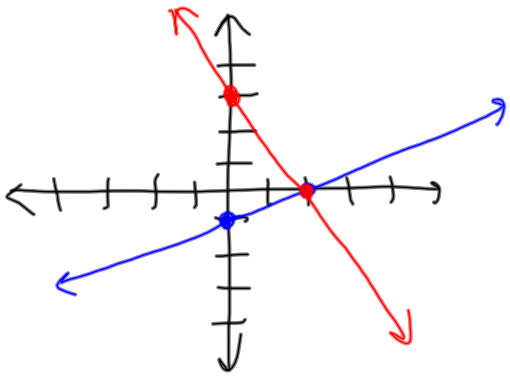
$m = 5$, $b = 8$

$$y = mx + b$$

$$y = 5x + 8$$

**Problem 3:**

What is the equation of the line?



$$y = mx + b$$

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

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

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Problem 4:

What is an equation in slope-intercept form of the line that passes through the points that follow?

a. $(1, -6)$ and $(-3, 10)$

$y = mx + b \rightarrow y = -4x + b$

① Find slope $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - -6}{-3 - 1} = \frac{10+6}{-4} = \frac{16}{-4}$

$m = -4$

② Find b.
- Pick ONE point
- Plug it in for x and y
- Plug in m.
- Solve for b.

$(\overset{x}{1}, \overset{y}{-6})$

$y = -4x + b$

$-6 = -4(1) + b$

$-6 = -4 + b$

$+4 \quad +4$

$-2 = b$

③ Write the equation, plugging in m + b.

$m = -4 \quad b = -2$

$\boxed{y = -4x - 2}$

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b. $(3, -2)$ and $(1, -3)$

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

$m = \frac{1}{2} \rightarrow y = \frac{1}{2}x + b$

$(\overset{x}{3}, \overset{y}{-2})$

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

$-2 = 1\frac{1}{2} + b$

$-1\frac{1}{2} \quad -1\frac{1}{2}$

$-\frac{7}{2}$ or $-3\frac{1}{2} = b$

$b = -3\frac{1}{2}, \quad m = \frac{1}{2}$

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

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c. $(2,1)$ and $(5,-8)$

$$m = \frac{-8-1}{5-2} = \frac{-9}{3} = -3$$

$y = -3x + b$ → $\boxed{y = -3x + 7}$

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

$1 = -6 + b$

$+6 \quad +6$

$7 = b$

d. $(-2,4)$ and $(3,-1)$

$$m = \frac{-1-4}{3+2} = \frac{-5}{5} = -1$$

$y = -x + b$

$(-2,4)$ $4 = -(-2) + b$

$4 = 2 + b$

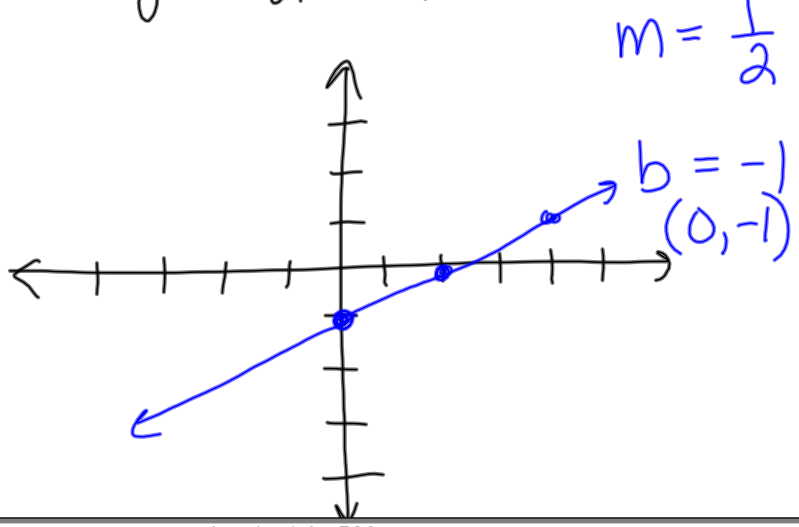
$-2 \quad -2$

$2 = b$

$\boxed{y = -1x + 2}$

Problem 5:

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

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