Chapter 7

↳ Different ways of writing an equation of a line.

$$y = \underbrace{m}x + \underbrace{b}$$

→ slope

→ y intercept

$$y - b = mx$$

$y = mx + b$ is the slope intercept form.

$$f(x) = 2x + 1$$

x	f(x)
-1	-1
0	1
1	3

slope $= \dfrac{y_2 - y_1}{x_2 - x_1}$

$$m = \dfrac{3 - 1}{1 - 0}$$

$$= \dfrac{2}{1}$$

$$= 2$$
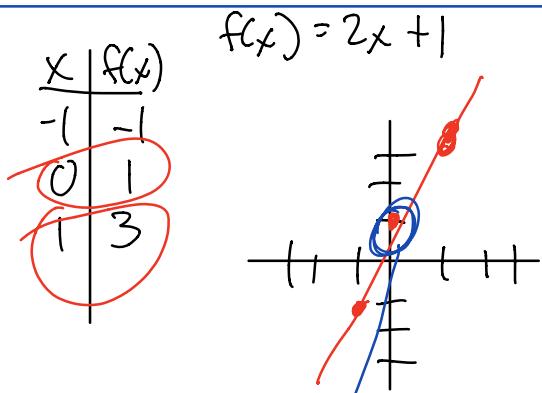
y - intercept

↳ where the line crosses the y-axis.

↳ happens when $x = 0$

if $x = 0$ $f(0) = 2(0) + 1$

$= 1$

y-int $= (0, 1)$

$$y = mx + b$$

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

examples

5a) write in $y = mx + b$
slope / intercept form

$(2x) + (y) = 6 \implies y = mx + b$

↑ unwanted guest.

subtract from each side:

$$y = -2x + 6$$

5c) $5x + 6y = 8$

↑ ↑
unwanted there's y.
term.
(Unkle Lukas)

goal → make it into
$y = mx + b$ (slope intercept form)

$6y = -5x + 8$

$y = \dfrac{-5x + 8}{6}$

$y = \dfrac{-5}{6}x + \dfrac{8}{6}$

$y = \boxed{\dfrac{-5}{6}x} + \boxed{\dfrac{4}{3}}$

m   b

8a) goal find m + b.

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

$P_1 (-2, -4)$ $P_2 (0, 4)$

$$= \frac{4 - (-4)}{0 - (-2)}$$

$$= \frac{8}{2}$$

$$\rightarrow = 4$$

b) $\rightarrow$ Crosses the y-axis

$b = 4$

9a) $y = 3x + b$

What is b if $P_1 = (4, 9)$

x, y

$x = 4$ $y = 9$

$9 = 3(4) + b$

$9 - 3(4) = b$
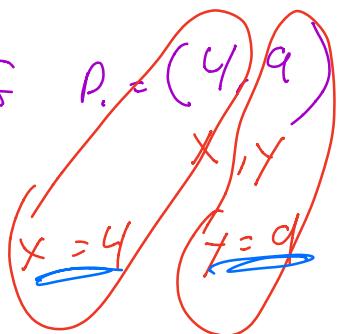
$9 - 12 = b$

$-3 = b$

10a) $y = mx - 2$ $P_1 (3, 1)$

$\downarrow$ $\downarrow$

x y

$$1 = m(3) - 2$$

$\uparrow$ goal

$$1 + 2 = 3m$$
$$3 = 3m$$
$$\frac{3}{3} = m$$
$$1 = m$$

5f) goal $\rightarrow$ $y = mx + b$ $\qquad$ $m = \underline{\quad}$
$b = \underline{\quad}$

$$8x - 4y = 3$$
$$-4y = -8x + 3$$
$$y = \frac{-8x + 3}{-4}$$
$$y = \frac{-8x}{-4} + \frac{3}{-4}$$
$$y = 2x - \frac{3}{4} \qquad m = 2$$
$$b = -\frac{3}{4}$$