FINDING THE EQUATION OF A LINE

March 7/16

The general equation of a line is...

$y = mx + b$

m: slope, b: y-int

To write the equation of a line, we need:

1. Slope
2. y-int

$y = -\frac{3}{4}x - 7$

Ex. 1. Write the equation of the line that has a slope of $-\frac{3}{4}$ and a y-intercept of -7.

Now, we are not always given the **slope** and the **y-intercept**!

*When given the **Slope** and a **Point**: (x, y) (4, 1)

1. Plug the slope(m) into the equation
2. Plug the **x** and **y values** into the equation
3. Solve the equation for b
4. Write the equation with values for m and b

$y = mx + b$

Ex. 1. Find the equation of the line that has:

a. slope -2, point (-4, 1) (x, y)

$y = -2x + b$

$1 = -2(-4) + b$

$1 = 8 + b \;//\; -8$

$-7 = b$

$y = -2x - 7$

b. m = $\frac{1}{2}$, point (0, -5)

$y = mx + b$

$-5 = \frac{1}{2}(0) + b$

$-5 = 0 + b$

$-5 = b$

$y = \frac{1}{2}x - 5$

c. m = $\frac{-3}{2}$, point (-8, 0)

*When given 2 Points: $(1,2)$ $(4,5)$ x_1, y_1 x_2, y_2

1. Use the points to find the slope $m = \frac{y_2 - y_1}{x_2 - x_1}$
2. Plug the slope and **one** point into the equation
3. Solve the equation for b
4. Plug values for m and b into the equation of a line

Ex. 3. Write the equation of the line passing through the points:

a. (4, 2) and (7, 8)

x_1, y_1 x_2, y_2

$m = \frac{8-2}{7-4}$

$= \frac{6}{3}$

$m = 2$

$m = 2$

point $(4,2)$

$y = mx + b$

$2 = 2(4) + b$

$2 = 8 + b \;//-8$

$-6 = b$

$y = 2x - 6$

b. (6, -10) and (-9, 15)

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

$= \frac{15 + 10}{-9 - 6}$

$= \frac{25}{-15}$

$= -\frac{25}{15}$ or $= \frac{-25}{15}$

$= -\frac{5}{3}$

$-\frac{5}{3} \times \frac{6}{1}$

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

$-10 = -\frac{5}{3}(6) + b$

$-10 = \frac{-30}{3} + b$

$-10 = -10 + b \;//\; +10$

$0 = b$

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

c. (6, -12) and (15, -3)

Homework:

Handout: Writing Equations of Lines

#2

#5acde

#7abcde