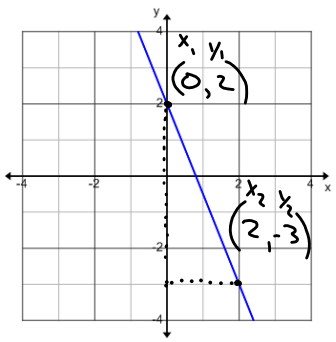
MPM 1DI - Unit 5
Linear Relations

Day 6
Finding an Equation Given 2 Points

Case A: Finding equation of a line from the graph



$b = 2$

$m = \frac{-5}{2}$

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

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

Case B: Find equation of a line given slope and a point

Example - find equation of a line with slope -3 and passing through the point (-1, 2).

$b = -1$

$m = -3$

$y = -3x + b$

$2 = -3(-1) + b$

$2 = 3 + b$

$-1 = b$

$y = -3x - 1$

Case C : Find equation of a line given two points.

Example find the equation of the line that passes through the points (4,3) and (7,9).

* Step #1 - calculate slope $x_1\ y_1 \quad x_2\ y_2$

$$\frac{y_2-y_1}{x_2-x_1} = \frac{9-3}{7-4} = \frac{6}{3} = 2$$

* Step #2 - Sub slope into y = mx + b

$y = 2x + b$

* Step #3 - Sub one point in for x & y and calculate b.

$y = 2x + b \quad (4,3)$

$3 = 2(4) + b$

$3 = 8 + b$

$-5 = b$

* Step #4 - Write the equation substituting in m & b.

$y = 2x - 5$

Example 1: Find an equation for the line passing through (-3,1) and (-2,-5).

$x_1\ y_1 \quad x_2\ y_2$

$$\frac{y_2-y_1}{x_2-x_1} = \frac{-5-1}{-2-(-3)} = \frac{-6}{1}$$

$m = -6$

$b = -17$

$y = -6x - 17$

$y = -6x + b$

$1 = -6(-3) + b$

$1 = 18 + b$

$-17 = b$

Example 2: Find an equation for the line passing through the point (4,5) and with an x intercept of 8.

$m = -\frac{5}{4}$ (x_1, y_1) $(8,0)$ (x_2, y_2)

$b = 10$

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{0-5}{8-4} = \frac{-5}{4}$

$y = -\frac{5}{4}x + 10$

$y = -\frac{5}{4}x + b$

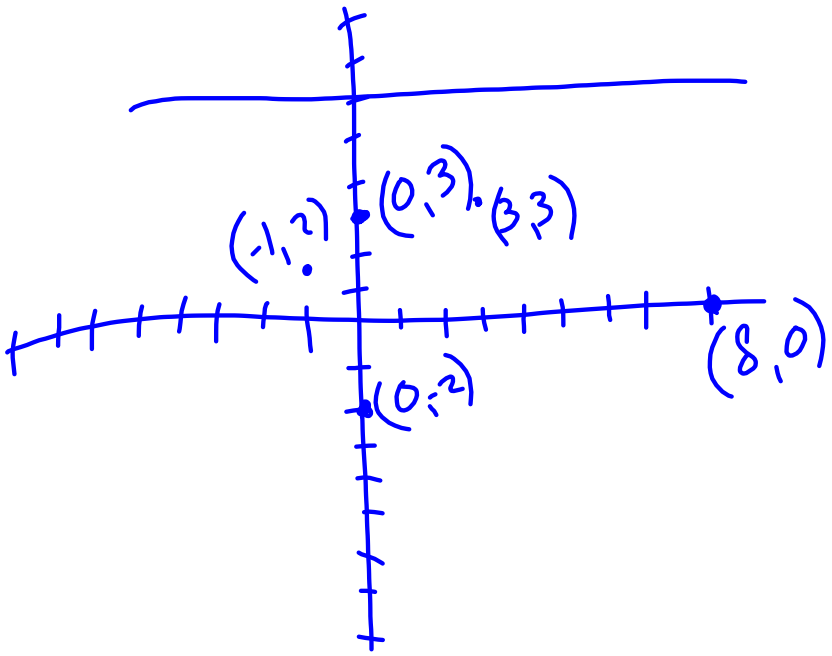
$5 = -\frac{5}{4}\left(\frac{4}{1}\right) + b$

$5 = \frac{-20}{4} + b$

$\times 5 \quad \times 5$

$5 = -5 + b$

$10 = b$



Example 3: Find an equation for the line passing through the point (4,5) and with a y intercept of 3.

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

$b = 3$

(x_1, y_1) $(0, 3)$ (x_2, y_2)

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{3-5}{0-4} = \frac{-2}{-4} = \frac{1}{2}$

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

Assigned work

Pg 342-343 # 1-4, 5(abdf), 8