MPM1DI Linear Relations

1. Graph each of the following using the indicated method:

a) $y' = \frac{1}{2}x' - 4$ (table of values – 5 entries)

	x	y	
-2×2	-4	$\frac{1}{2}(-4) - 4 = -2 - 4 = -6$	$(-4, -6)$
-1×2	-2	$\frac{1}{2}(-2) - 4 = -1 - 4 = -5$	$(-2, -5)$
0×2	0	$\frac{1}{2}(0) - 4 = 0 - 4 = -4$	$(0, -4)$
1×2	2	$\frac{1}{2}(2) - 4 = 1 - 4 = -3$	$(2, -3)$
2×2	4	$\frac{1}{2}(4) - 4 = 2 - 4 = -2$	$(4, -2)$

b) $5x - 4y = 20$ (intercepts)

For x-int: let $y = 0$

$5x - 4(0) = 20$

$\frac{5x}{5} = \frac{20}{5}$

$x = 4$

Plot $(4, 0)$

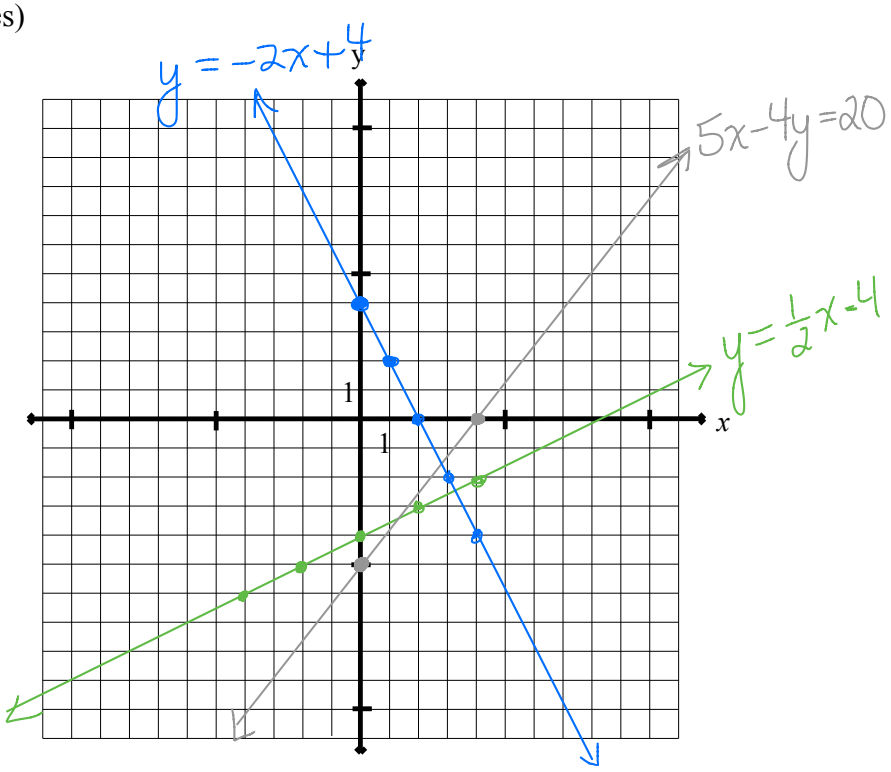
For y-int: let $x = 0$

$5(0) - 4y = 20$

$\frac{-4y}{-4} = \frac{20}{-4}$

$y = -5$

Plot $(0, -5)$



c) $y = -2x + 4$ (slope, y-intercept)

$m = -2 = \frac{-2}{1}$ $\frac{\text{rise}}{\text{run}}$

$b = 4$ Plot $(0, 4)$

d) $2x - 3y = 0$ (any method)

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

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

$m = \frac{2}{3}$ $\frac{\text{rise}}{\text{run}}$

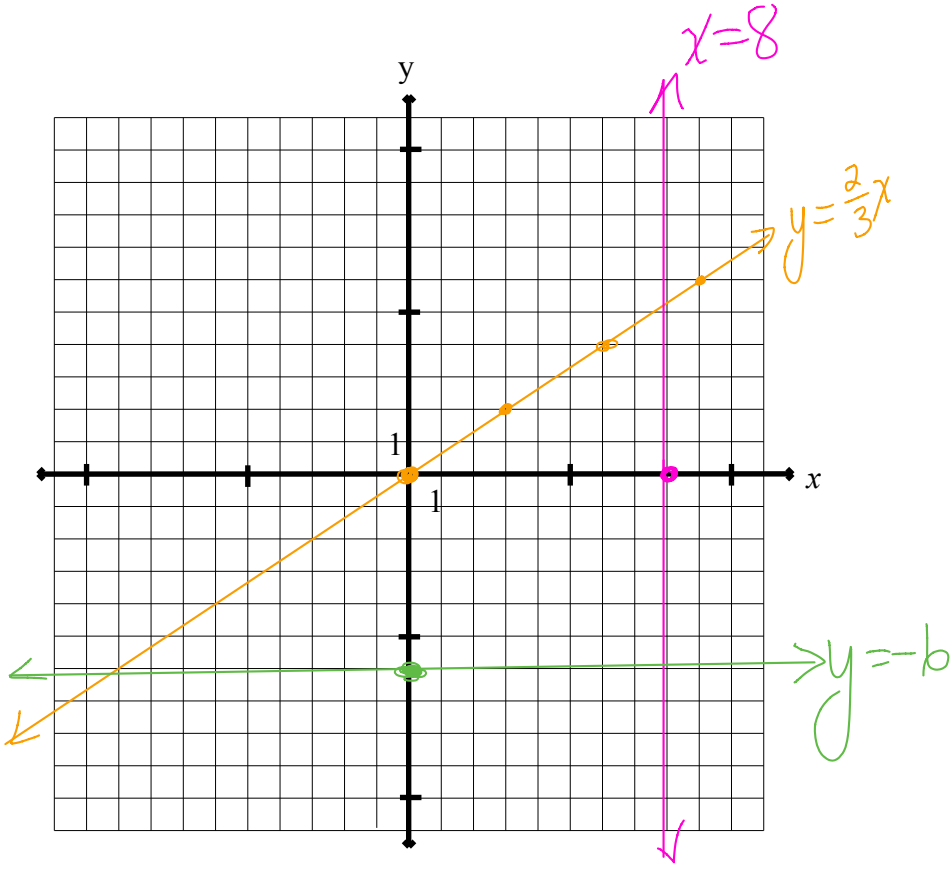
$b = 0$ Plot $(0, 0)$

e) $x - 8 = 0$ (any method)

$x = 8$ vertical

f) $y = -6$ (any method)

horizontal



2. Determine the equation of the line in $y = mx + b$ form:

a) with a slope of $\frac{2}{3}$ and passing through the point $(\overset{x}{-5}, \overset{y}{1})$

$m = \frac{2}{3}$ $\quad b = \_\_\_$

$x = -5$ $\quad y = 1$

Find b:

$y = mx + b$

$1 = \frac{2}{3}(-5) + b$

$1 = \frac{-10}{3} + b$

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

$\frac{13}{3} = b$

$\therefore y = \frac{2}{3}x + \frac{13}{3}$ is the equation

b) through the points $(\overset{x_1}{-3}, \overset{y_1}{7})$ and $(\overset{x_2}{5}, \overset{y_2}{-3})$

$m = \_\_\_$ $\quad b = \_\_\_$

① Find m:

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

$m = \frac{-3-7}{5-(-3)}$

$m = \frac{-10}{8}$

$m = \frac{-5}{4}$

② Find b:

$m = -\frac{5}{4}$, $b = \_\_\_$

$x = -3$, $y = 7$

$y = mx + b$

$7 = -\frac{5}{4}(-3) + b$

$7 = \frac{15}{4} + b$

$\frac{28}{4} - \frac{15}{4} = b$

$\frac{13}{4} = b$

$\therefore y = -\frac{5}{4}x + \frac{13}{4}$ is the equation.