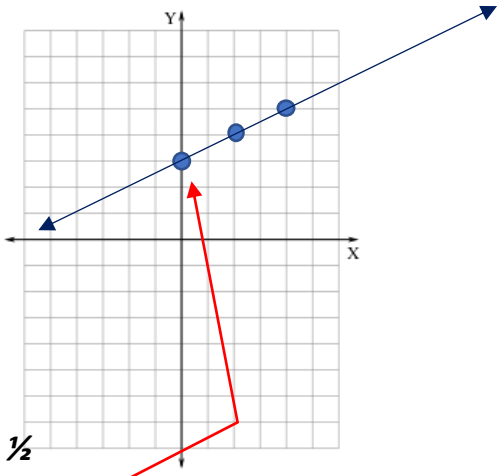
Writing equations #1

Consider the line
Y = ½ x + 3

Graph it:

x	y
0	3
2	4
4	5



Notice the slope = ½

Y intercept = + 3

Which are the 2 #'s in the equation

All defined lines have the form: $y = mx + b$

(This is called slope-y-intercept form)

that's a creative name …

So, to write the equation of any line we need:

- *the slope of the line*
- *a point it passes thru*

1) Find the equation of a line with:

a) slope of 6, passing thru (½ , -5)

Step 1: *place the slope* $y = 6x + b$

Step 2: *plug in given point* $-5 = 6(\frac{1}{2}) + b$ $-5 = 3 + b$

Step 3: *solve for b and write final equation:* $b = -8$ *Answer:* $y = 6x - 8$

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b) slope of $\frac{2}{3}$, *passing thru (-8 , 1)*

$y = \frac{2}{3}x + b$ → $1 = \frac{2}{3}(-8) + b$ → $1 = \frac{-16}{3} + b$

$b = \frac{19}{3}$ *Answer:* $y = \frac{2}{3}x + \frac{19}{3}$

Notice that we work in fractions – NOT decimals as we want exact equation of a line

c) *slope of* $\frac{-3}{4}$, *passing thru (1, 3)*

$y = \frac{-3}{4}x + b$ → $3 = \frac{-3}{4}(1) + b$ → $3 = \frac{-3}{4} + b$

$b = \frac{15}{4}$ *Answer:* $y = \frac{-3}{4}x + \frac{15}{4}$

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d) *y-intercept of 4, passing thru (-9, 6)*

Here we are missing the slope – but we know b *y = mx + 4*

6 = m(-9) + 4 → *2 = -9m* → $m = \frac{2}{-9}$

Answer: $y = \frac{-2}{9}x + 4$

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e) *Slope of 0 passing thru (6, -4)*

y = 0x + b → *-4 = b* *Answer:* *y = -4*

Did we just find a short-cut for graphing?

Sketch:

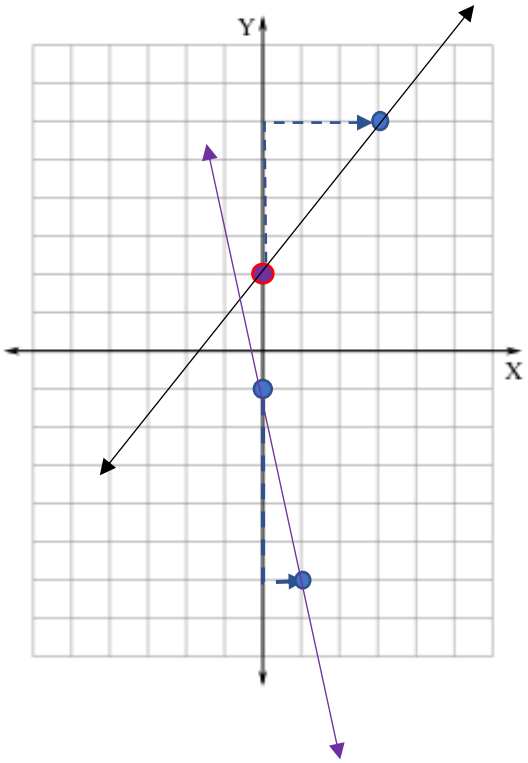
a) $y = \frac{4}{3}x + 2$

plot y-intercept of 2 from there rise 4, run 3

b) $y = -5x - 1$

plot y-intercept of -1 from there rise -5, run 1

No more table of values needed???



Assignment = Worksheet

Why Did Gyro Go into the Bakery?

Write letter in appropriate box

9	5	12	10	8	2	1	10	6	4	12	3	4	11	11	2	8	7	10

1) m = 2, passing thru (3, 2)

2) m = -3, (1, 4)

3) m = -5 (-1, 3)

4) m = 3, (-4, -7)

5) m = -1, (5, -2)

6) m = ½ , (6, 1)

7) m = $\frac{-2}{3}$, (3, 4)

8) m = $\frac{4}{3}$, (-2,0)

9) m = $\frac{-1}{4}$, (2, 1)

10) m = 4, (-1, ½)

12) m = 0 , (-5, ¾)

11) m = -2, (0, 0)

ANSWERS

G	$y = 2x + 1$	R	$y = 2x - 4$
O	$y = -3x + 7$	P	$y = -3x + 2$
M	$y = -5x - 2$	D	$y = -5x + 6$
V	$y = 3x + 1$	E	$y = 3x + 5$
U	$y = -x + 3$	C	$y = -x - 1$
W	$y = \frac{1}{2}x - 5$	H	$y = \frac{1}{2}x - 2$

A	$y = -\frac{2}{3}x - 7$	I	$y = -\frac{2}{3}x + 6$
K	$y = \frac{4}{3}x + \frac{5}{2}$	F	$y = \frac{4}{3}x + \frac{8}{3}$
J	$y = -\frac{1}{4}x + \frac{3}{2}$	D	$y = -\frac{1}{4}x - \frac{3}{8}$
A	$y = 4x - \frac{2}{3}$	T	$y = 4x + \frac{9}{2}$
L	$y = -2x$	B	$y = -2x - 2$
S	$y = \frac{3}{4}$	N	$y = -5x$

Now complete Page 362 #4, 6, 17, 18, 19 ,20