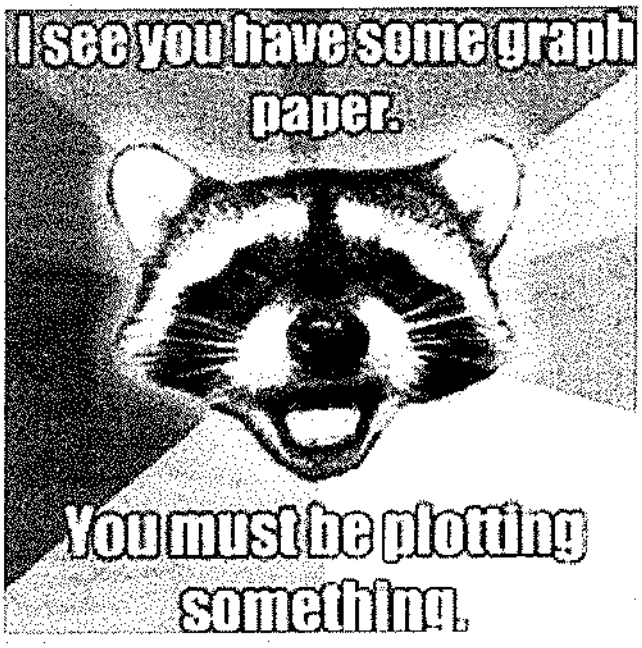
Notes

* Quiz Review in the back.

Graphing Linear Functions



3 types of linear functions

Standard Form: $Ax + By = C$

Slope-Intercept Form $y = mx + b$

Point-Slope form $y - y_1 = m(x - x_1)$ (x_1, y_1) point

Graphing lines in standard form (Ax + By = C)

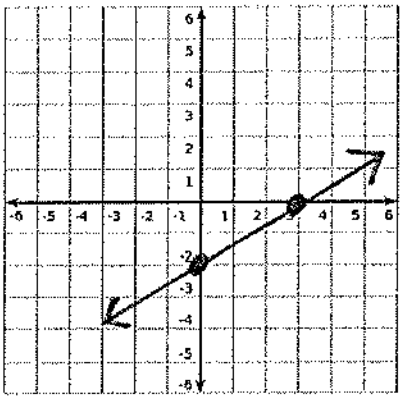
*1) Find the **x-intercept:** let y = 0 and solve for x.*
x-intercepts: (x,0)

*2)Find the **y-intercept:** let x = 0 and solve for y.*
y-intercepts: (0, y)

3) Connect the points.

$Ax + By = C$

1) $2x - 3y = 6$

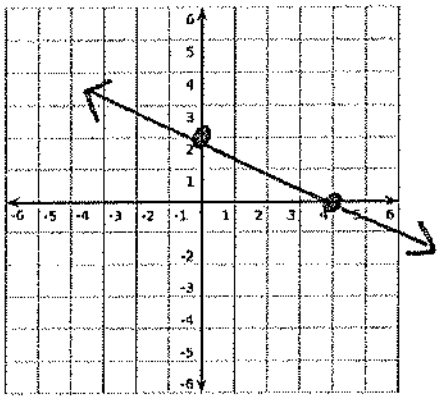


x-int	y-int
$y = 0$	$x = 0$
$2x - 3(0) = 6$	$2(0) - 3y = 6$
0	0
$\frac{2x}{2} = \frac{6}{2}$	$\frac{-3y}{-3} = \frac{6}{-3}$
$x = 3$	$y = -2$
$(3, 0)$	$(0, -2)$

$Ax + By = C$

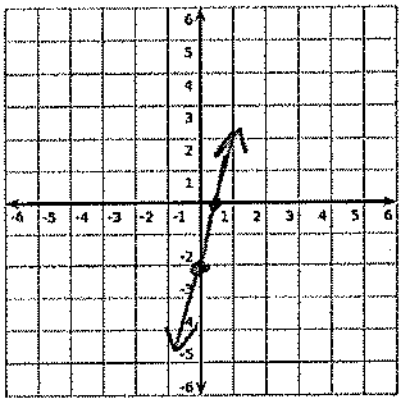
2) $x + 2y = 4$

x-int	y-int
$y = 0$	$x = 0$
$x + 2(0) = 4$	$0 + 2y = 4$
$x = 4$	$\frac{2y}{2} = \frac{4}{2}$
$(4, 0)$	$y = 2$
	$(0, 2)$



3) $5x - y = 2$

X-int	y-int
$y = 0$	$x = 0$
$5x - (0) = 2$	$5(0) - y = 2$
$5x = 2$	$-y = 2$
$x = \frac{2}{5}$	$y = -2$
$(\frac{2}{5}, 0)$	$(0, -2)$



slope

Graphing a line in slope-intercept form (y = mx + b)

y-intercept

1) Determine the y-intercept of the line, b.
The coordinate is (0, b). Plot this point.

2) Determine the slope of the line, m.

3) From the y-intercept, use the slope to find your second point, third, etc...

4) Connect the points.

slope

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The coordinate is (0, b). Plot this point.

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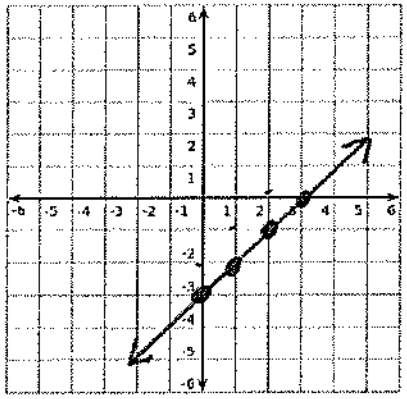
3) From the y-intercept, use the slope to find your second point, third, etc . . .

4) Connect the points.

$y = mx + b$

4) $y = |x - 3$



y-int: $(0, b)$

: $\boxed{(0, -3)}$

$\boxed{m = 1} = \frac{1}{1} \frac{\text{rise}}{\text{run}}$

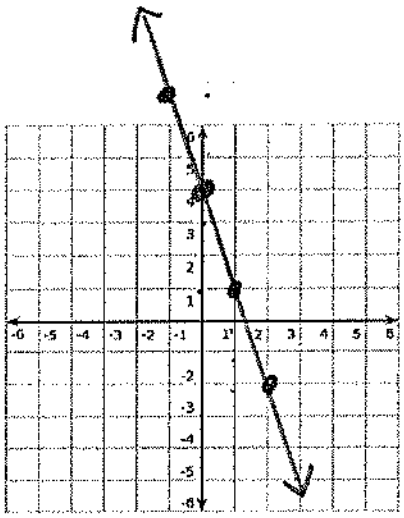
Slope ↑

positive slope = Increasing Graph

L → R

$y = mx + b$

5) $y = -3x + 4$



y-int: $(0, b)$

: $\boxed{(0, 4)}$

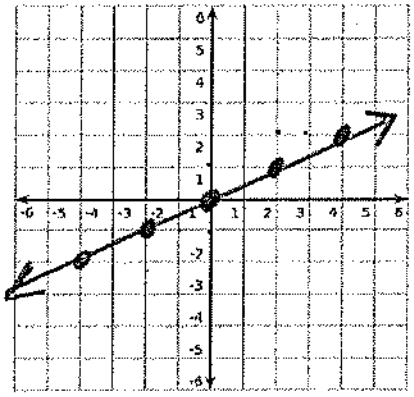
$\boxed{m = -3} = \frac{-3}{1}$ or $\frac{3}{-1}$

↑

negative slope = decreasing graph L → R

$y = mx + b$

6) $y = \frac{1}{2}x + 0$



y-int: $(0, b)$

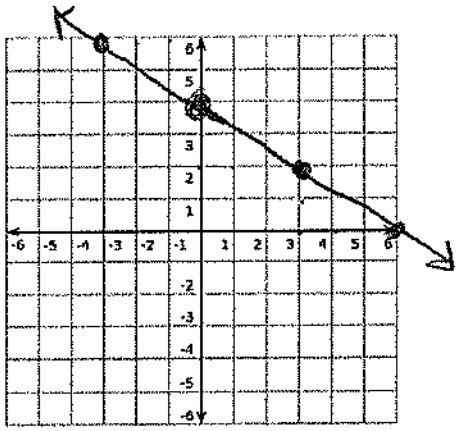
: $\boxed{(0, 0)}$

$\boxed{m = \frac{1}{2}}$ or $\frac{-1}{-2}$

$y = mx + b$

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

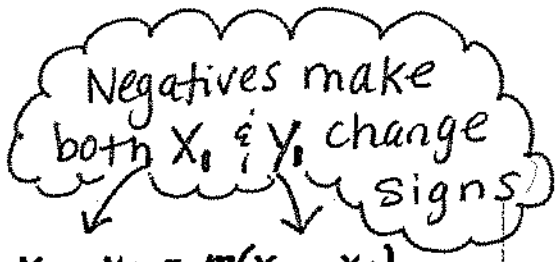
$\boxed{m = -\frac{2}{3}} = \frac{-2}{3}$ or $\frac{2}{-3}$



y-int

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

$\boxed{(0, 4)}$



Graphing a line in point-slope form: $y - y_1 = m(x - x_1)$

1) Determine the point (x_1, y_1)***. Then plot the point.***

2) Determine the slope, m. From the point plotted, use the slope to find your second point, third, etc...

3) Connect the points.

Negatives make both x_1 & y_1 change signs

Graphing a line in point-slope form: $y - y_1 = m(x - x_1)$

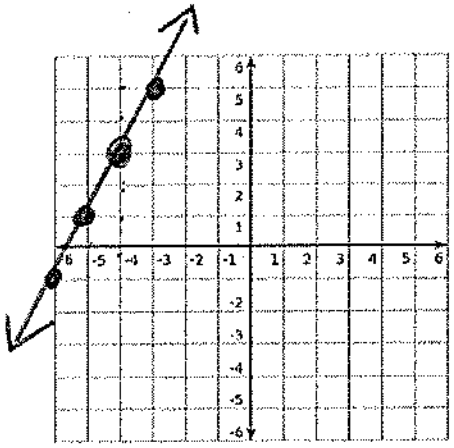
1) Determine the point (x_1, y_1). ***Then plot the point.***

2) Determine the slope, m. From the point plotted, use the slope to find your second point, third, etc . . .

3) Connect the points.

$$y - y_1 = m(x - x_1)$$

8) $y - 3 = 2(x + 4)$



Point: (x_1, y_1)

take opposite signs. $\boxed{(-4, 3)}$

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

pt-slope

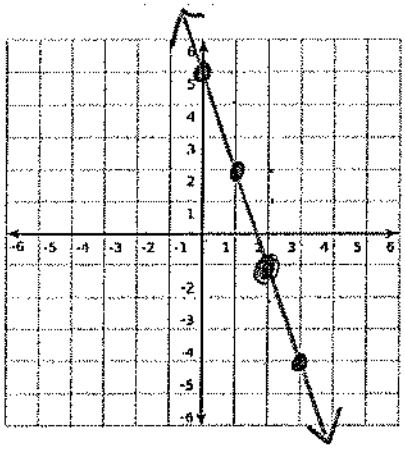
$y - y_1 = m(x - x_1)$

9) $y + 1 = -3(x - 2)$

↑

Point: $\boxed{(2, -1)}$

$\boxed{m = -3} = \frac{-3}{1} = \frac{3}{-1}$

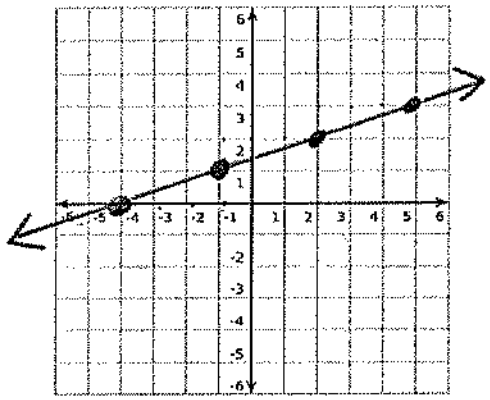


pt-slope

10) $y-1=\frac{1}{3}(x+1)$

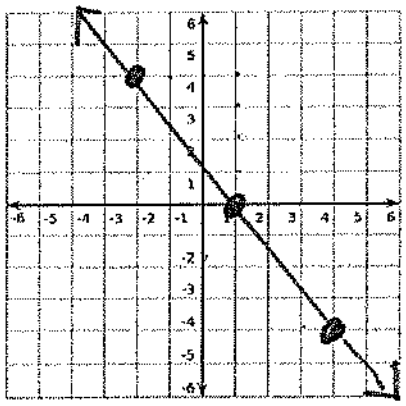
pt: $\boxed{(-1,1)}$

$\boxed{m=\frac{1}{3}} = \frac{-1}{-3}$



Slope intercept or (pt-slope) *

11) $y = -\frac{4}{3}(x-1)$



$y + 0 = -\frac{4}{3}(x-1)$

point: $(1, 0)$

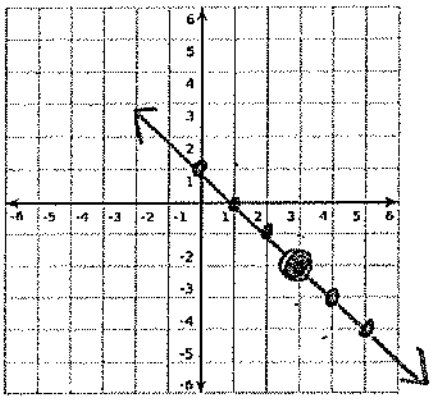
$m = -\frac{4}{3} = \frac{-4}{3}$ or $\frac{4}{-3}$

pt-slope

12) $y+2=-(x-3)$

$y+2=-1(x-3)$

point: $\boxed{(3,-2)}$



$\boxed{m=-1} = \frac{-1}{1} = \frac{1}{-1}$

Review for quiz: Evaluating functions/Function operations

$h(1.3) = |9 - 4(1.3)|$

$= |9 - 5.2|$

$= |3.8|$

$\boxed{h(1.3) = 3.8}$

$1.3 \times 4 = 5.2$

$9.10 - 5.2 = 3.8$

Evaluate.

$f(x) = \frac{3}{4}x - 9$	$g(x) = -x^2 - 5x + 1$	$h(x) = \lvert 9 - 4x \rvert$

1) $f\left(\frac{8}{3}\right)$

$f\left(\frac{8}{3}\right) = \frac{3}{4}\left(\frac{8}{3}\right) - 9$

$= \frac{24}{12} - 9$

$= 2 - 9$

$\boxed{f\left(\frac{8}{3}\right) = -7}$

2) $h(1.3)$ (above)

3) $g(-2)$

$g(-2) = -(-2)^2 - 5(-2) + 1$

$= -[(-2)(-2)] - 5(-2) + 1$

$= -[4] - 5(-2) + 1$

$= -4 + 10 + 1$

$= 6 + 1$

$\boxed{g(-2) = 7}$

Evaluate.

$f(x)=7x-9$	$g(x)=-x^2-5x+1$	$h(x)=3x^2+5$

4) $g(x)-f(x)$

$=(-x^2-5x+1)-(7x-9)$

$=-x^2-5x+1-7x+9$

$=\boxed{-x^2-12x+10}$

5) $3f(x)+g(x)$ (no sign change)

$=3(7x-9)+(-x^2-5x+1)$

$=21x-27-x^2-5x+1$

$=\boxed{-x^2+16x-26}$

Evaluate.

$f(x)=7x-9$	$g(x)=-x^2-5x+1$	$h(x)=3x^2+5$

6) $(f \cdot h)(x)$ ← mult

$f(x) \cdot h(x)$

Foil $= (7x-9)(3x^2+5)$

$= 21x^3+35x-27x^2-45$

$= \boxed{21x^3-27x^2+35x-45}$

7) $h(x+2)$

$= 3(x+2)^2+5$

$= 3\boxed{(x+2)(x+2)}+5$ FOIL

$= 3(x^2+2x+2x+4)+5$

$= 3(x^2+4x+4)+5$

$= 3x^2+12x+12+5$

$= \boxed{3x^2+12x+17}$

Evaluate.

$f(x)=7x-9$	$g(x)=-x^2-5x+1$	$h(x)=3x^2+5$

8) $f(-1)-g(2)$

$(-16)-(-13)$

$-16+13$

-3

$f(-1)=$

$f(x)=7x-9$

$f(-1)=7(-1)-9$

$=-7-9$

$f(-1)=-16$

$g(2)=$

$g(x)=-x^2-5x+1$

$g(2)=-(2)^2-5(2)+1$

$=-4-10+1$

$=-14+1$

$=-13$

9) $(f+h)(-2)$

$f(-2)+h(-2)$

$(-23)+(17)$

$=-6$

$f(-2)=$

$f(x)=7x-9$

$f(-2)=7(-2)-9$

$=-14-9$

$=-23$

$h(-2)=$

$h(x)=3x^2+5$

$h(-2)=3(-2)^2+5$

$=3(4)+5$

$=12+5$

$=17$

10) $h(0)\cdot g\left(\frac{1}{2}\right)$

$\left(\frac{5}{1}\right)\cdot\left(\frac{-7}{4}\right)=\frac{-35}{4}$

$h(0)=$

$h(x)=3x^2+5$

$h(0)=3(0)^2+5$

0

$=5$

$g\left(\frac{1}{2}\right)=$

$g(x)=-x^2-5x+1$

$g\left(\frac{1}{2}\right)=-\left(\frac{1}{2}\right)^2-5\left(\frac{1}{2}\right)+1$

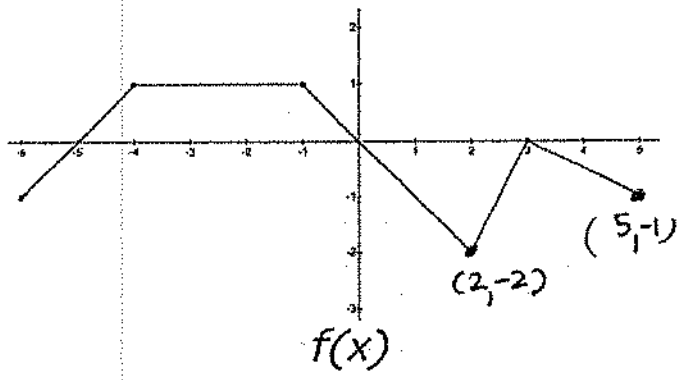
$=-\frac{1}{4}-\frac{5}{2}\cdot\frac{2}{2}+\frac{1}{1}\cdot\frac{4}{4}$

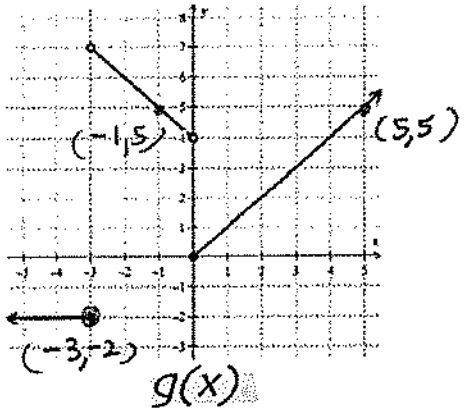
$=-\frac{1}{4}-\frac{10}{4}+\frac{4}{4}$

$=-\frac{11}{4}+\frac{4}{4}$

$=-\frac{7}{4}$

Evaluate.





11) $f(2) - g(-3)$

$(-2) - (-2)$

$-2 + 2$

0

Label

$f(2) = -2$

$g(-3) = -2$

12) $5g(-1) + 3f(5)$

$5(5) + 3(-1)$

$25 + (-3) = 22$

Label

$g(-1) = 5$

$f(5) = -1$

13) $(g - f)(5)$

$g(5) - f(5)$

$(5) - (-1)$

$5 + 1 = 6$

Label

$g(5) = 5$

$f(5) = -1$