M10 - 7.1 - Standard/General Form Notes

Graph the Line in Standard Form: **x and y intercept method**

$3x + 2y = 6$

OR

x	y
0	
	0

$3x + 2y - 6 = 0$

Subtract 6 on Both Sides

$$\boxed{\begin{gathered} Ax + By = C \\ Ax + By - C = 0 \end{gathered}}$$

Y Intercept:

$3x + 2y = 6$ Equation

$2(0) + 2y = 6$ Put Zero in for x

$2y = 6$ Solve

$\frac{2y}{2} = \frac{6}{2}$

(x, y)

$y = 3$ $(0,3)$

X Intercept:

$3x + 2y = 6$ Equation

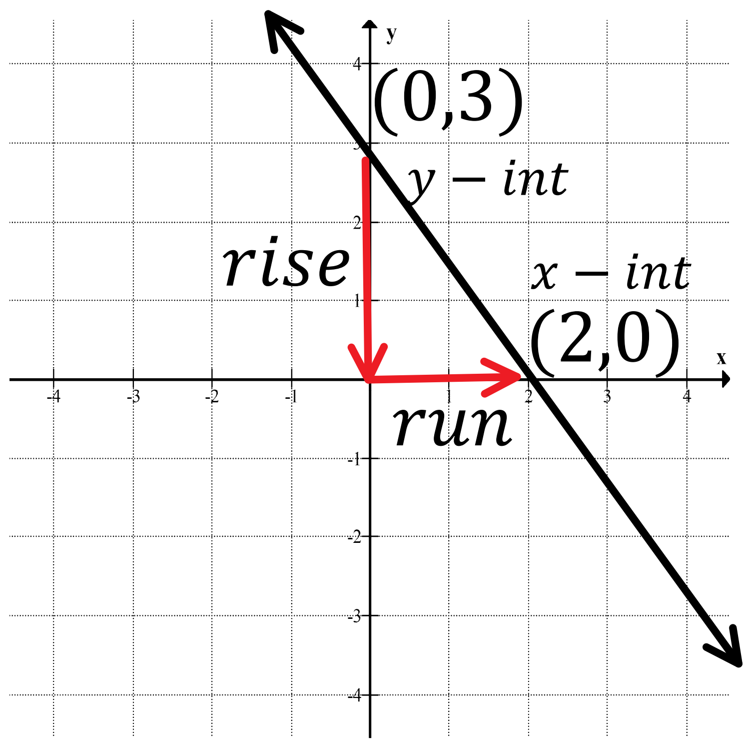
$3x + 2(0) = 6$ Put Zero in for y

$3x = 6$ Solve

$\frac{3x}{3} = \frac{6}{3}$

(x, y)

$x = 2$ $(2,0)$



Converting Forms

Standard to Slope Intercept

$$\boxed{Ax + By + C = 0 \longrightarrow y = mx + b}$$

$3x + 2y = 6$ Equation

$-3x \qquad -3x$ Subtract $3x$ to Both Sides

$2y = -3x + 6$

$\frac{2y}{2} = -\frac{3x}{2} + \frac{6}{2}$ Divide Both Sides by 2

$y = -\frac{3}{2}x + 3$ Slope Intercept Equation

$Slope = -\frac{3}{2}$ $\quad y - int: (0,3)$

$y = mx + b \leftarrow y - intercept: (0,b)$

$Slope = \frac{rise}{run}$

Slope Intercept to Standard

$$\boxed{y = mx + b \longrightarrow Ax + By + C = 0}$$

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

$\left(y = -\frac{3}{2}x + 3\right) \times 2$ Multiply Both Sides by 2 (LCD^*)

$2y = -3x + 6$

$+3x \qquad +3x$ Add $3x$ to Both Sides

$3x + 2y = 6$ Standard From Equation

$-6 \quad -6$ Subtract 6 from Both Sides

$3x + 2y - 6 = 0$ Standard Form Equation

$Ax + By = C$
$Ax + By - C = 0$
$+x$ coefficient
$x, y, \#/= 0$ Order
No Fractions

M10 - 7.2 - Slope Intercept Form ($y = mx + b$) Notes

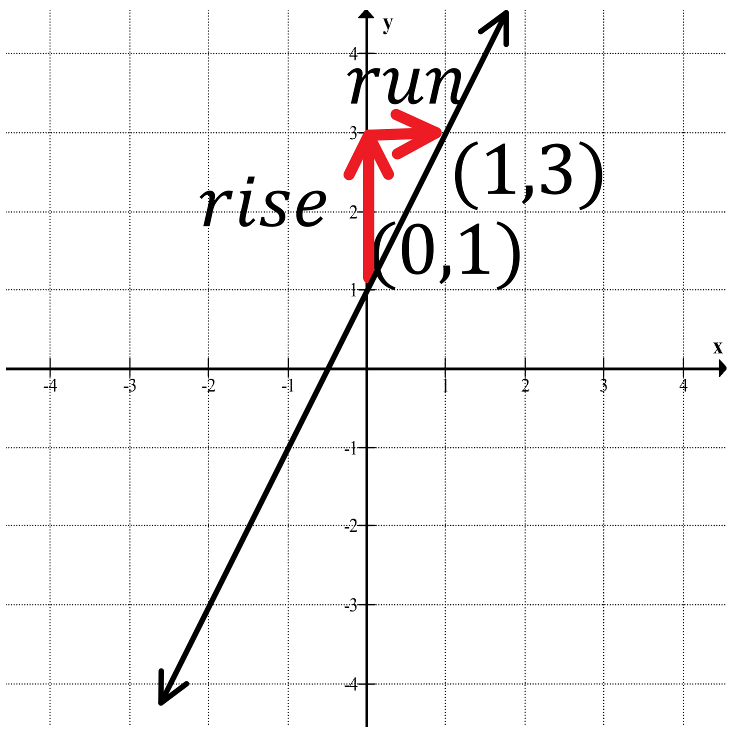
Graphing Slope Intercept Form. **Slope Intercept Method**

$y = 2x + 1 \longleftarrow$ $y - intercept$: $(0,1)$

$\uparrow$

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

$$\boxed{\begin{array}{l} y = mx + b \longleftarrow y - intercept: (0,b) \\ \uparrow \\ Slope = \dfrac{rise}{run} \end{array}}$$



Steps:

Plot $y - intercept$: $(0,1)$

Use slope: $\frac{2}{1}$ $\longleftarrow$ Rise, $\longleftarrow$ Run

Plot new Point: (1,3)

Put Point in Other Direction

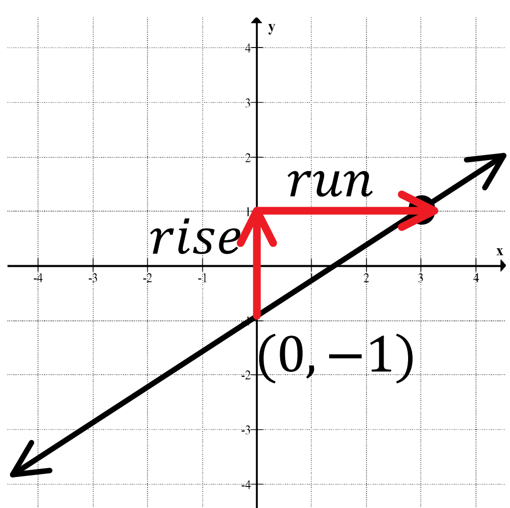
Draw New Points

Draw line

Arrow Tips

x	y
-1	-1
0	1
1	3
-2	-3

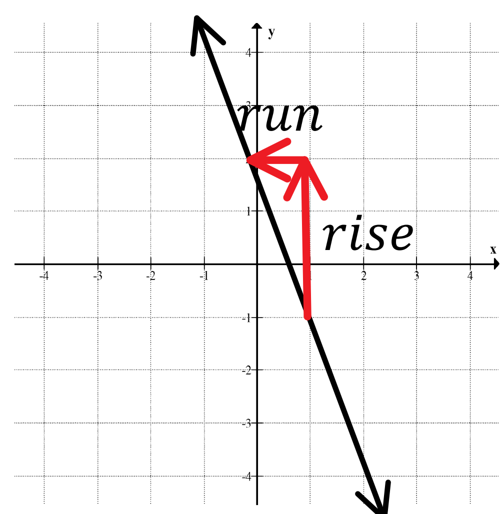
Find Equation in Slope Intercept Form



$y - int$: $(0,-1)$ $\quad$ $slope = m = \frac{2}{3}$

$y = mx + b$ $\quad$ Equation

$y = \frac{2}{3}x - 1$ $\quad$ Substitute b,m



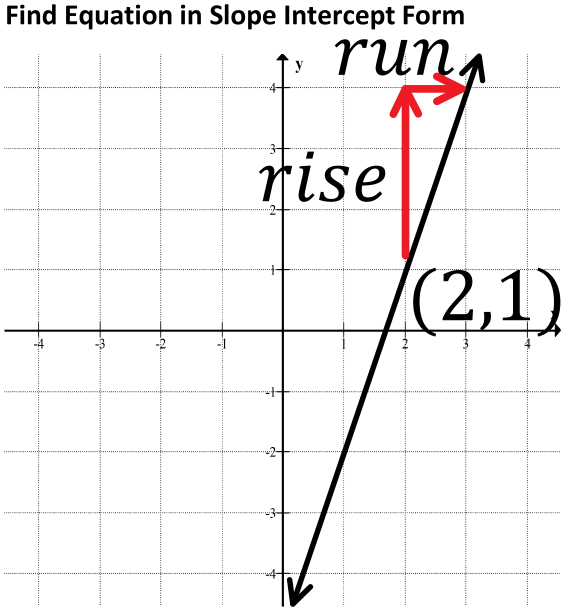
$y - int$: $(0,2)$ $\quad$ $slope = m = -\frac{3}{1}$

$y = mx + b$ $\quad$ $\boxed{\frac{-3}{1} = \frac{3}{-1} = -\frac{3}{1}}$

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

M10 - 7.3 - Slope Point Form $y - y_1 = m(x - x_1)$ *Notes*

Find Equation in Slope Intercept Form



$$\text{Point } (x_1, y_1)$$
$$y - y_1 = m(x - x_1)$$
$$Slope = \frac{rise}{run}$$

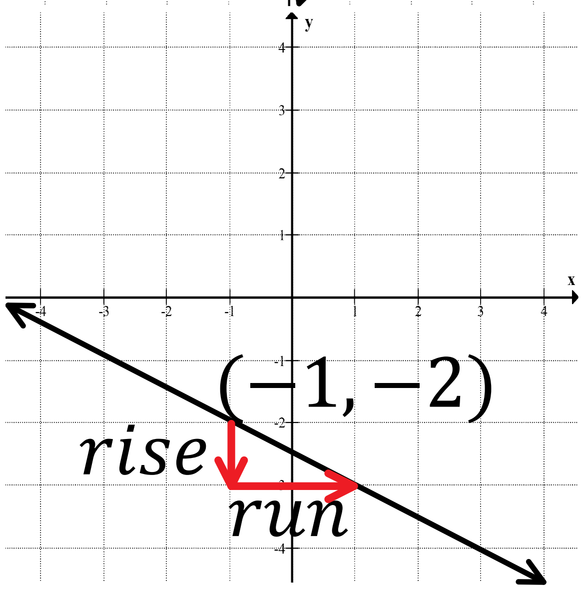
Steps:

Find Point — *Point* $(2,1)$ (x_1, y_1)

Find Slope — $slope = m = \frac{3}{1}$

Equation — $y - y_1 = m(x - x_1)$

Substitute m
Point — $y - 1 = \frac{3}{1}(x - 2)$



Steps:

Find Point — *Point* $(-1,-2)$ (x_1, y_1)

Find Slope — $slope = m = -\frac{1}{2}$

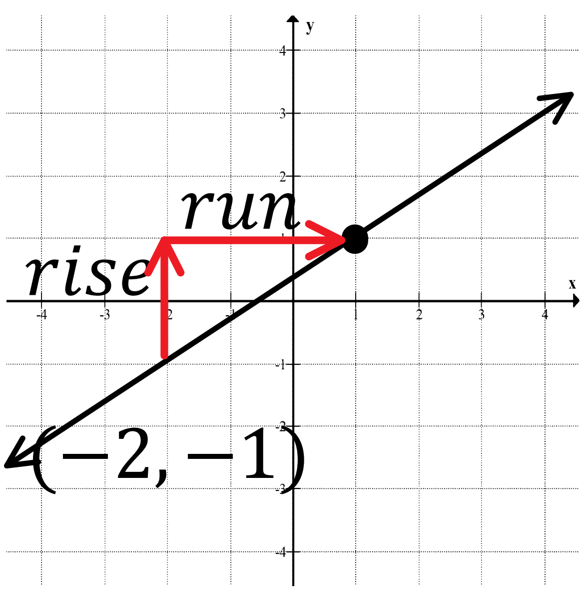
Equation — $y - y_1 = m(x - x_1)$

Substitute with Brackets

Substitute m
Point — $y - (-2) = -\frac{1}{2}(x - (-1))$

Simplify — $y + 2 = -\frac{1}{2}(x + 1)$

Graph Slope Intercept Form



Steps:

Equation — $y + 1 = \frac{2}{3}(x + 2)$

Write Form — $y - y_1 = m(x - x_1)$

Find Point
Graph Point — *Point* $(-2,-1)$ (x_1, y_1)

Notice it's the Opposite of what's Inside the Brackets

Find Slope
Graph Slope — $slope = m = \frac{2}{3}$

M10 - 7.4 - Find Equation Slope Int/Slope Pt Form Algebra Notes

Given a point and the slope: $(1,3)$ $m = 2$
(x, y)

$\boxed{y - y_1 = m(x - x_1) \longrightarrow y = mx + b}$

Slope Intercept Form:

$y = mx + b$	Slope Intercept Form
$y = (2)x + b$	Substitute m
$(3) = (2)(1) + b$	Substitute x and y
$3 = 2 + b$	
$-2 \quad -2$	
$1 = b$	Solve for b
$y = mx + b$	Slope Intercept Form
$y = (2)x + (1)$	Substitute m and b

$y = 2x + 1$ ⟵ They are equal ⟶

Slope Point Form:

$y - y_1 = m(x - x_1)$	Slope Point Form
$y - y_1 = 2(x - x_1)$	Substitute m
$y - (3) = 2(x - (1))$	Substitute x and y
$y - 3 = 2(x - 1)$	**Slope Point to Slope Intercept Form**
$y - 3 = 2(x - 1)$	
$y - 3 = 2x - 2$	Distribute
$+3 \quad +3$	Add 3 to Both Sides
$y = 2x + 1$	Slope Intercept Form

Given two points: $(0,1)$ and $(1,3)$
(x_1, y_1) (x_2, y_2)

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$	Slope Equation
$m = \dfrac{(3) - (1)}{(1) - (0)}$	Substitute With Brackets
$m = \dfrac{2}{1}$	
$m = 2$	Find m

Repeat Beginning of page!

It doesn't matter which point you use

Slope Intercept Form to Slope Point Form

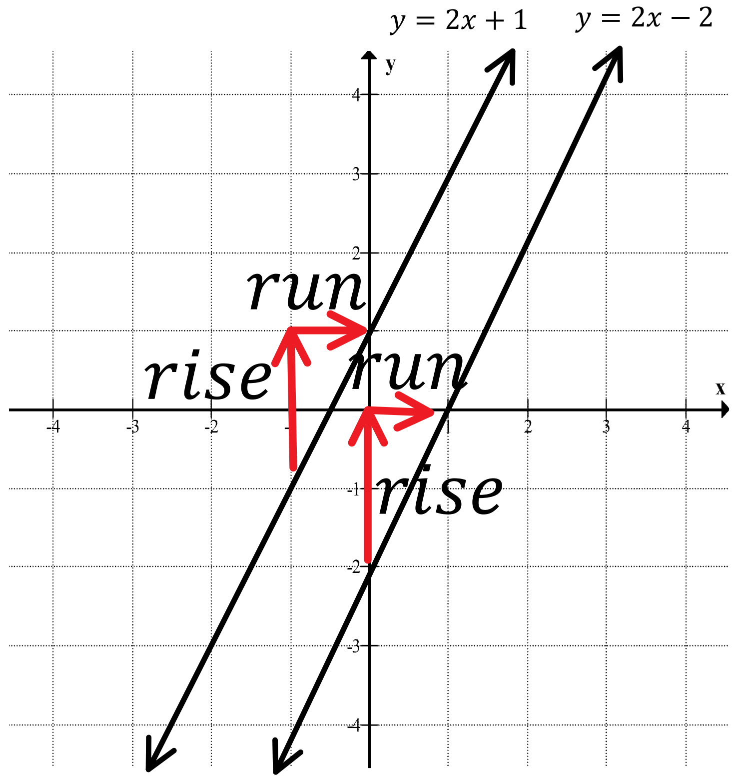
$$y = mx + b \xrightarrow[\text{(N/A)}]{} y - y_1 = m(x - x_1)$$

General Form to Slope Point Form

$$Ax + By + C = 0 \xrightarrow[\text{(N/A)}]{} y - y_1 = m(x - x_1)$$

M10 - 7.5 - Parallel $m = m$/Perpendicular $m = -\frac{1}{m}$ Lines Notes

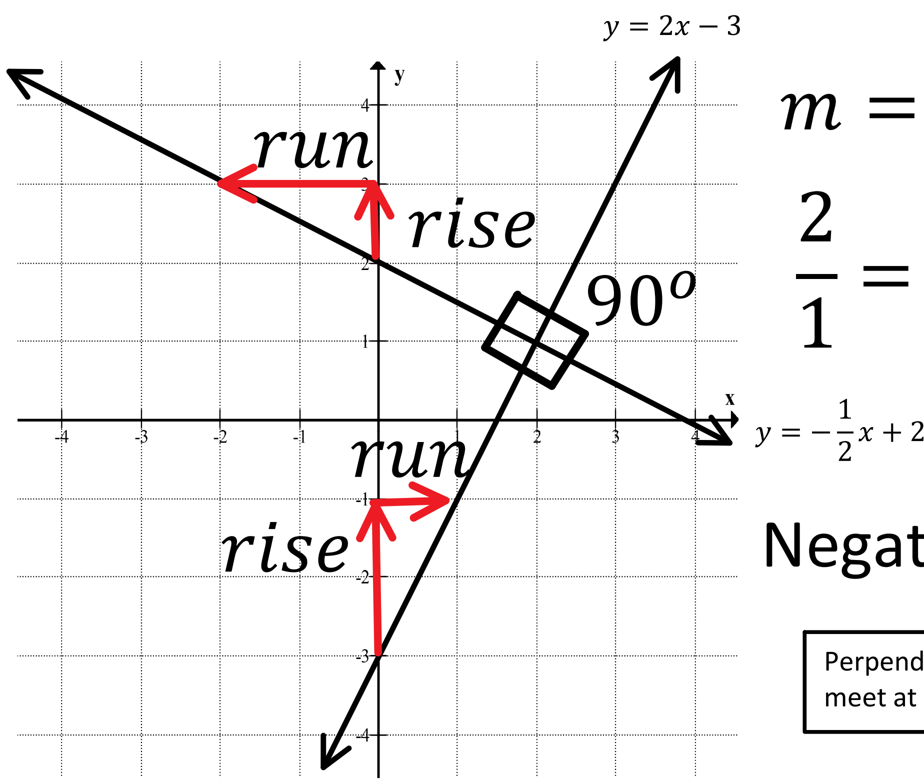
Parallel Lines: lines which never cross. Lines with the **<u>Same Slope</u>**. $m = m$



$$m = m$$
$$2 = 2$$
Same Slope

Notice: the graph of $y = 2x - 2$ and $y = 2x + 1$ are parallel because they have the same slope.

Perpendicular Lines: two lines which have N**<u>egative Reciprocal</u>** slopes and meet at 90º. $m = -\frac{1}{m}$



$$m = -\frac{1}{m}$$
$$\frac{2}{1} = -\frac{1}{2}$$
Negative Flip

Perpendicular Lines meet at a 90 degree.

Notice: The slope of the one line is the negative reciprocal of the slope of the other.