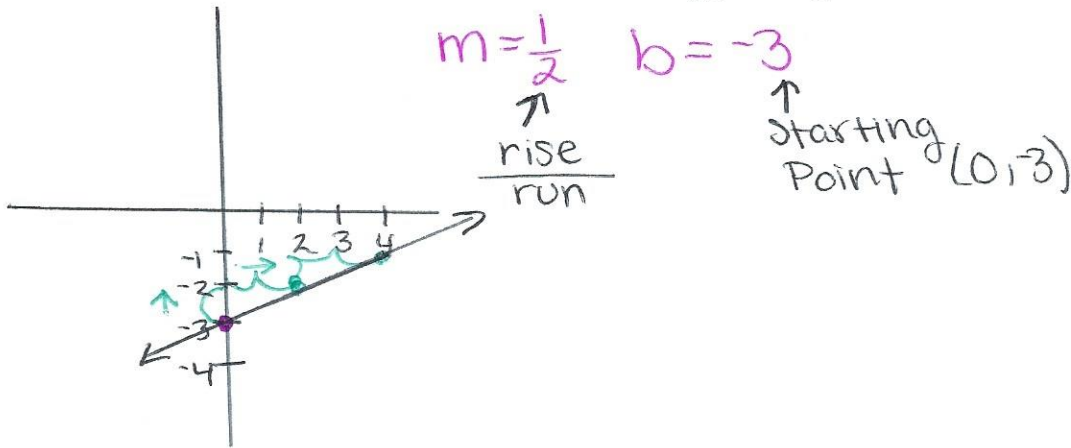


Linear Equations in two variables and Linear function.

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Math 2311
Tue 2/5/19 pgl

Forms

- Slope-intercept form: $F(x) = mx + b$
+ Graph: $f(x) = \frac{1}{2}x - 3$



- Standard form: $Ax + By = C$ (Least common form)
- Point-slope form: $y - y_1 = m(x - x_1)$
 (x_1, y_1) is your point.

Slope formula

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

ex Determine the slope from 2 points:

$$\begin{matrix} (-2, 5) & (3, 7) \\ x_1 & y_1 & x_2 & y_2 \end{matrix}$$

$$m = \frac{7 - 5}{3 - (-2)} = \boxed{\frac{2}{5}} \quad \text{Positive slope}$$

• Use the slope to find the y-intercept.
 $(-2, 5)$ $(3, 7)$ $\underline{m} = \underline{2/5}$

$$y = \underline{m}x + b$$

$$7 = 2/5(3) + b$$

$$7 = 6/5 + b$$

$$5(7 = 6/5 + b)$$

$$35 = 6 + 5b$$

$$35 - 6 = 5b$$

$$\underline{29} = b$$

$$y = 2/5x + 29/5$$

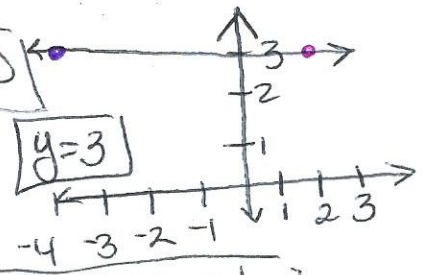
Vertical and Horizontal Lines (Special Cases)

* Ex $(2, 3)$ and $(-4, 3)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 3}{-4 - 2} = \frac{0}{-6} = 0$$

Slope is 0

Horizontal line

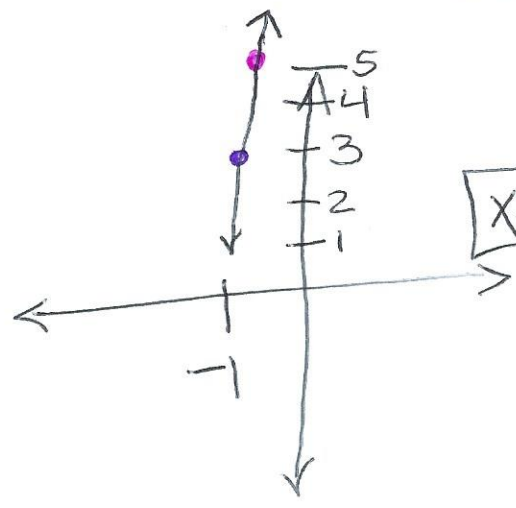


Constant function

* Ex $(-1, 5)$ and $(-1, 3)$

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

$x = -1$



Parallel and Perpendicular lines

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- Parallel Lines - same slope but different y-intercepts.

[ex] $L_1: 2x - 3y = 4 \rightarrow 3y = 2x - 4 \rightarrow y = \left(\frac{2}{3}\right)x - \frac{4}{3}$

$L_2: -4x + 6y = 7 \rightarrow 6y = 4x + 7 \rightarrow y = \frac{4}{6}x + \frac{7}{6} \rightarrow y = \left(\frac{2}{3}\right)x + \frac{7}{6}$

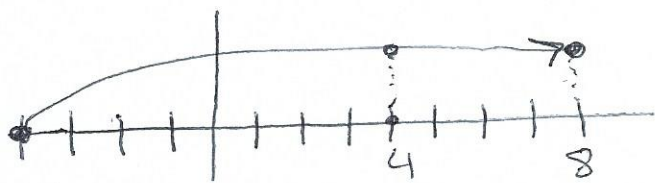
$L_1 + L_2$ are Parallel

- Perpendicular lines - intersect and form in 90° angles.

Slope of \perp lines are opposite reciprocals.

$m_1 = 2/3 \quad m_2 = -3/2$

[ex] $g(x) = \sqrt{x-4}$ Average rate of change from $x=4$ to $x=8$



$g(4) = \sqrt{4-4} = \sqrt{0} = 0$

$g(8) = \sqrt{8-4} = \sqrt{4} = 2$

$(4, 0) \quad (8, 2)$

$m = \frac{2-0}{8-4} = \frac{2}{4} = \left[\frac{1}{2}\right]$

average rate of change