

## Class Discussion

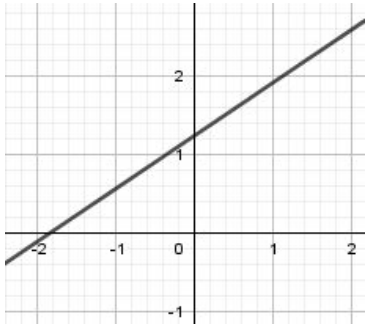
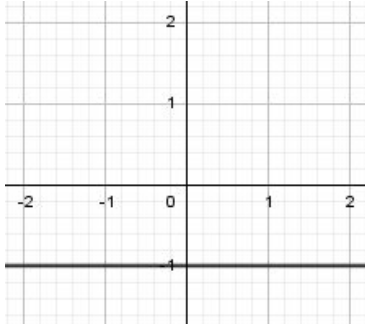
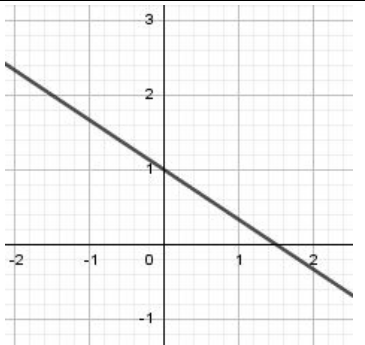
### Unit 1 Topic 1 Lines in a plane

The basics:

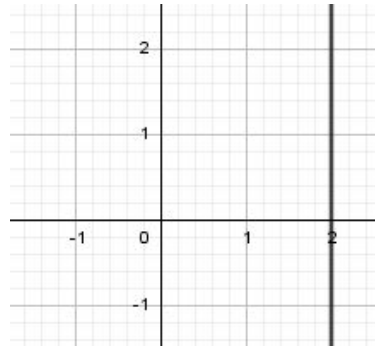
- Slope:

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

As powerful as a slope can describe the lines in a plane, its limitation comes when the slope of a given line in a plane is undefined.

$m > 0$	 A Cartesian coordinate system with x and y axes ranging from -2 to 2. A line with a positive slope is graphed, passing through the points (-2, 0), (0, 1), and (2, 2).
$m = 0$	 A Cartesian coordinate system with x and y axes ranging from -2 to 2. A horizontal line is graphed at y = -1, passing through the points (-2, -1), (0, -1), and (2, -1).
$m < 0$	 A Cartesian coordinate system with x and y axes ranging from -2 to 2. A line with a negative slope is graphed, passing through the points (-2, 2), (0, 1), and (2, 0).

m is undefined.



Point-Slope Form:

Any given line with slope m (this implies that m is defined), can be written in the following form

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

Where  $(x_1, y_1)$  is a point on the line.

Relationships between slopes of a pair of parallel lines and a pairs of perpendicular lines (  $m_1$  ,  $m_2$  )

- Parallel lines:  $m_1 = m_2$
- Perpendicular lines:  $m_1 \cdot m_2 = -1$

Ex1: Given a point  $(\frac{2}{5}, -1)$  and a line  $3x - 2y = 6$

(a) find the parallel line that passes through the given point

(b) find the perpendicular line that passes through the given point

Explanation of interval notations:

Ex2: For the following functions find

(a) domain (b) range (c) y-intercept (d) x-intercept

$$f(x) = x^2 - 3x + 2$$

$$g(x) = \begin{cases} 2 - x, & x > 3 \\ x^2 - 4, & x \leq -2 \end{cases}$$

(Write your answers in the interval notations whenever it applies)

