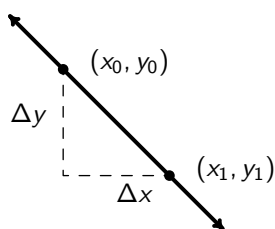


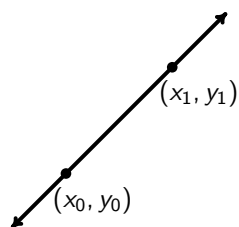
## MATH 1650: SECTION A.5: REVIEW OF LINES

**SLOPE:** The **slope**,  $m$ , of the line containing two  $(x_0, y_0)$  and  $(x_1, y_1)$ , is:  $m = \frac{y_1 - y_0}{x_1 - x_0} = \frac{\Delta y}{\Delta x}$ , provided  $\Delta x \neq 0$ .

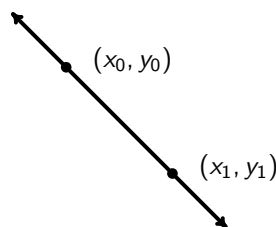


### FOUR CASES:

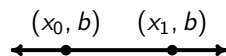
- Increasing line:  $m > 0$ :



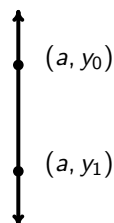
- Decreasing line:  $m < 0$ :



- Horizontal line:  $y = b$ .  
 $\Delta y = 0$ , so  $m = 0$ .



- Vertical line:  $x = a$ .  
 $\Delta x = 0$ , so slope is undefined.



### EQUATIONS OF LINES:

- **General Form:**  $Ax + By + C = 0$ . (Equations for all lines can be written in this form.)

**NOTE:** The variables here ( $x$  and  $y$ ) are to the first power. The constants  $A$ ,  $B$ , and  $C$  are 'parameters.'

- **Vertical Lines on the  $xy$ -plane:**  $x = a$ .
- **Horizontal Lines on the  $xy$ -plane:**  $y = b$ .

- **Point-Slope Forms:** The **point-slope form** of a line through the point  $(x_0, y_0)$  with slope  $m$  is:  $y - y_0 = m(x - x_0)$ .  
**Alternatives:**  $y = m(x - x_0) + y_0$  or  $y = y_0 + m(x - x_0)$

- **Slope-( $y$ -)Intercept Form:** When graphed on the  $xy$ -plane:  $y = mx + b$  has slope  $m$  and  $y$ -intercept  $(0, b)$ .  
– **NOTE:** If  $m = 0$ , both the point-slope and slope-intercept forms reduce to  $y = b$  (a horizontal line.)

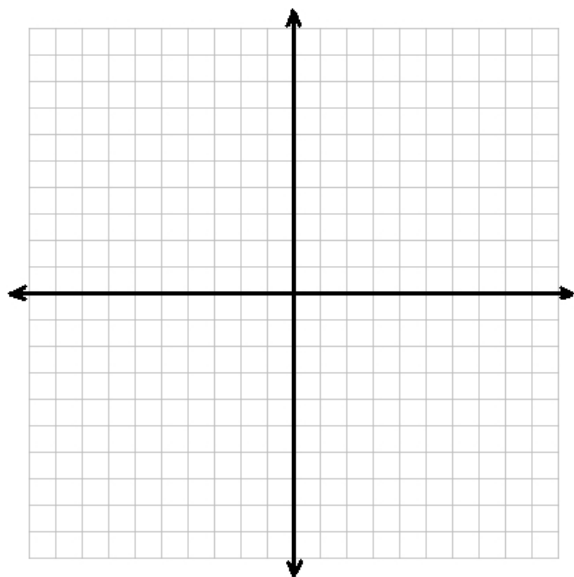


**EXAMPLE:** For each pair of points, find the slope between the points, graph the line containing the points, and find the slope-intercept equation of the line, where possible.

- $(-3, 4)$  and  $(2, 1)$ .

- Slope:

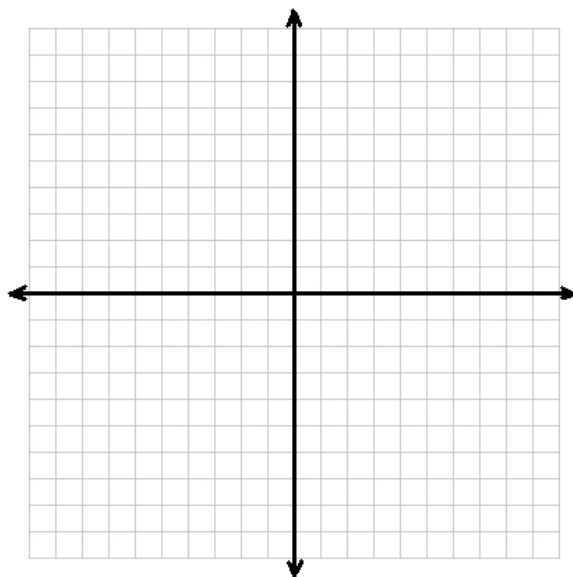
- Equation:



- $\left(-\frac{1}{2}, \frac{7}{4}\right)$  and  $\left(\frac{3}{2}, \frac{15}{4}\right)$ .

- Slope:

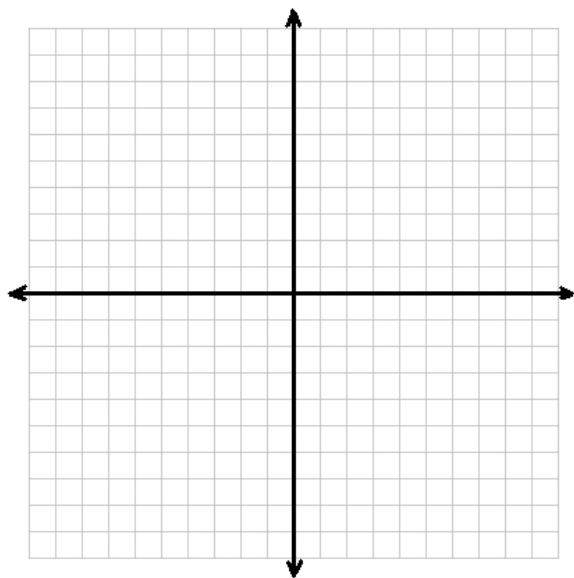
- Equation:



- $(-5, 6.5)$  and  $(1, 6.5)$ .

- Slope:

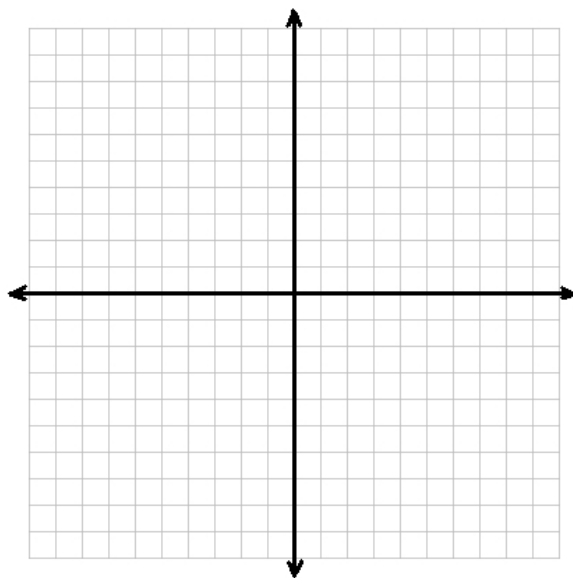
- Equation:



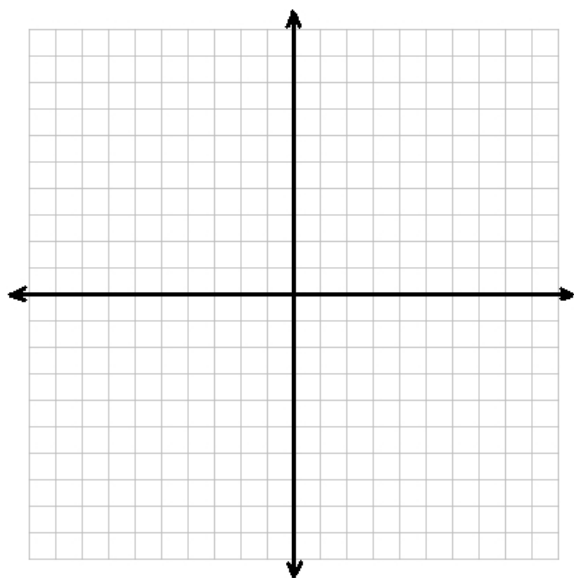
- $(\sqrt{5}, 3)$  and  $(\sqrt{5}, -4)$ .

- Slope:

- Equation:

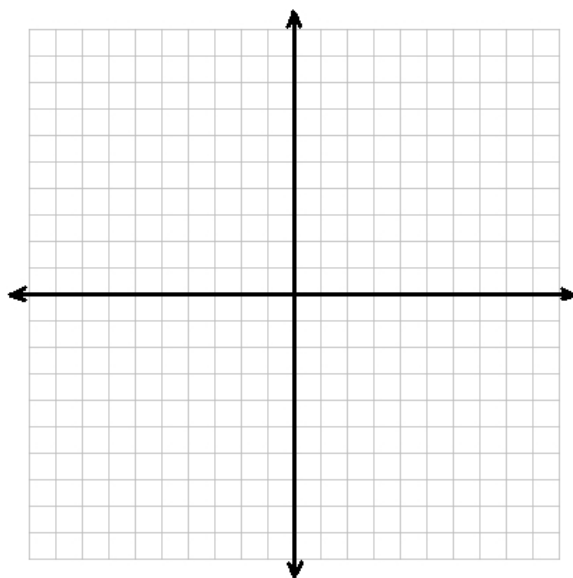


**EXAMPLE:** Graph  $3s + 2t = 6$  below on each of the given pairs of axes. What are the slopes in each case?



$st$ -plane

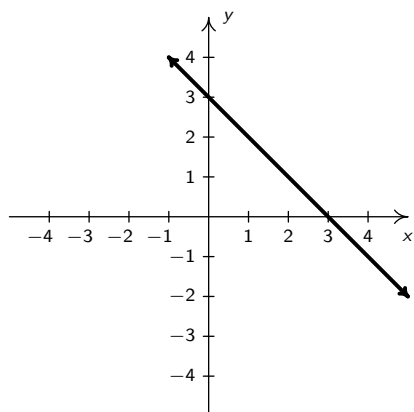
Slope:



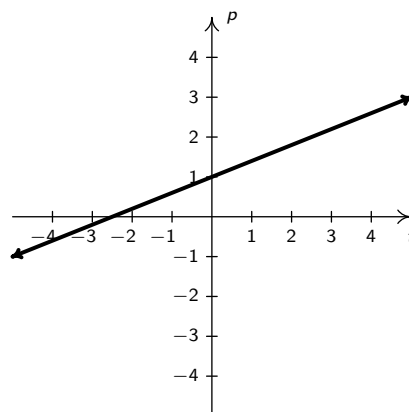
$ts$ -plane

Slope:

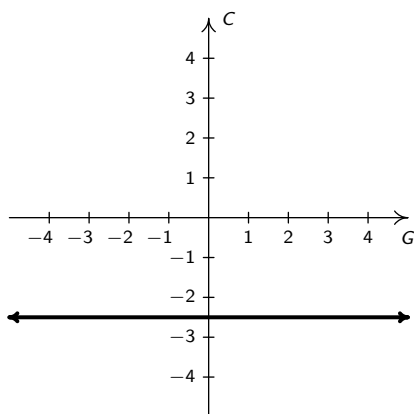
**EXAMPLE:** Find an equation of the following lines, where possible.



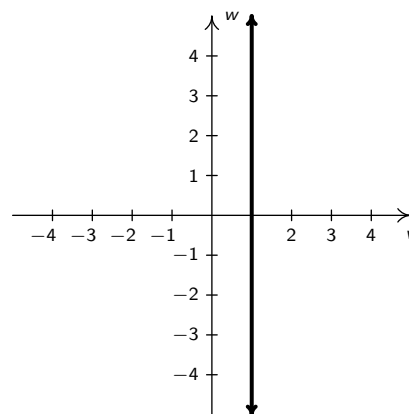
Equation:



Equation:



Equation:



Equation:

**ADDITIONAL REVIEW:** Section A.5: 1 - 41 every other odd.