

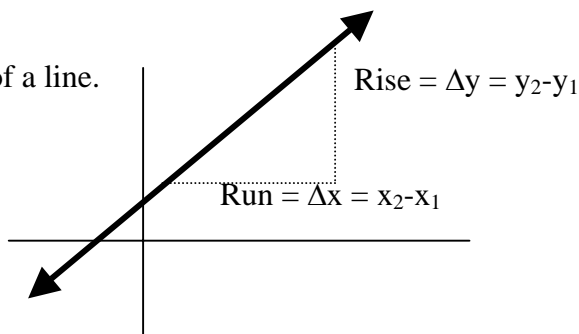
In the first unit of this course, we will be using linear functions to model the relationship between the number of items that a company will sell and the selling price of the item. In order to do this, we will use data to write the equation of a line. The purpose of this worksheet is to review the steps in finding the equation of a line.

Recall that a linear function has the form  $y = mx + b$ , or, using function notation,  $f(x) = mx + b$ . The graph of every linear function is a line.

In order to find the equation of the line, the constants  $m$  and  $b$  must first be determined, where  $m$  is the **slope** of the line and  $b$  is the ***y*-intercept**, that is, the point at which the line crosses the  $y$ -axis.

The first step is to find the slope, or slant, of a line.

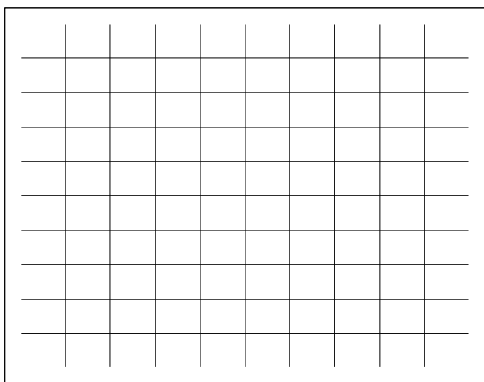
$$\text{Slope: } m = \frac{\text{Rise}}{\text{Run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$



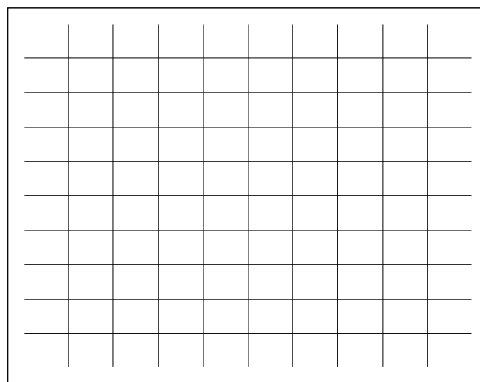
Examples

- For each pair of points, plot the two points, draw the line through the points, and then find the slope of the line through the points:

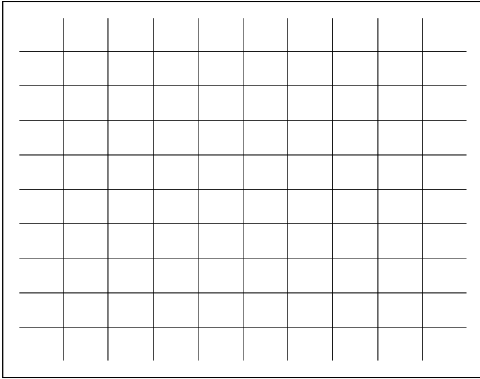
(a) (-1, 2) and (1,8)



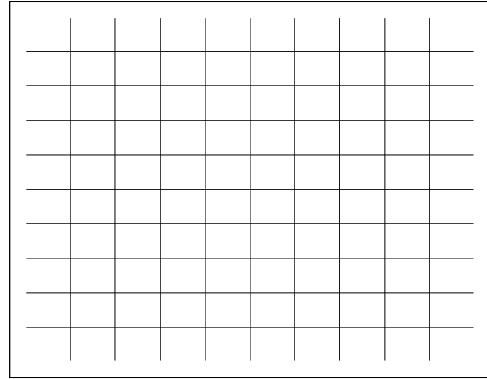
(b) (-2, 5) and (3, -1)



(c) (2, 4) and (5, 4)



(d) (3, -1) and (3, 5)



2. Based on your graphs and slopes in problem #1,
- (a) If a line has a positive slope, what does that tell you about the graph of the line?
  - (b) If a line has a negative slope, what does that tell you about the graph of the line?
  - (c) If a line has zero slope, what does that tell you about the graph of the line?
  - (d) If a line has undefined slope, what does that tell you about the graph of the line?
3. If possible, use the slope-intercept formula  $y = mx + b$  to find the equation of each line in #1. Note: when the slope is undefined, this formula cannot be used. Write the equation of this type of line if you remember how to do it, but we will also discuss it together.