LINES

Graph using a t-table

2x – 3y = 9

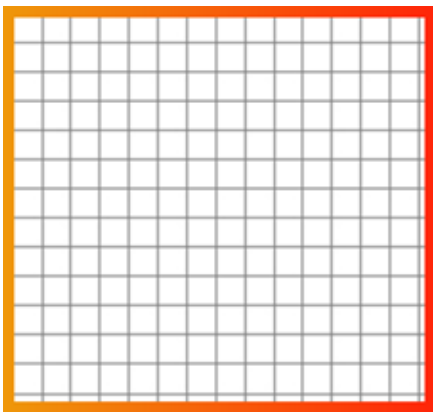
- Recommend solving the equation for y
- Choose values for x (independent variable)
  - In this case, multiples of 3 are recommended, why?

x	y
-3	-5
0	-3
3	-1

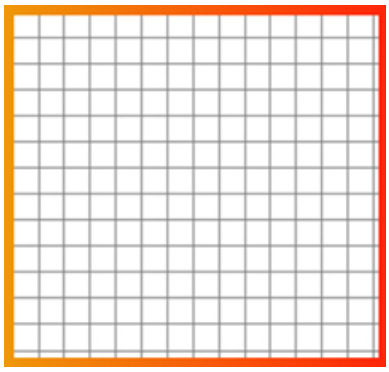
- Substitute x-value and find y-value (dependent variable)
- Plot the points

Guided Practice: Graph 2x – y = 4

y = 2/3x – 3



Graph using double intercept



- To find the y-intercept (where the line crosses the y-axis, substitute x = 0 and solve for y
- To find the x-intercept (where the line crosses the x-axis, substitute y = 0
- Given 2x – 3y = 6: write the 2 ordered pairs (0, __) (___, 0), now cover the x and solve for y, then cover the y and solve for x. Plot the points.
  Discussion: Why can we just cover the x? y? (0, -2)(3, 0)

Guided practice: Graph -4x + 2y = 6

Lines that Contain the Origin

If the line goes through the origin, both the x-intercept and y-intercept will be 0. In this case, some other point must be used.

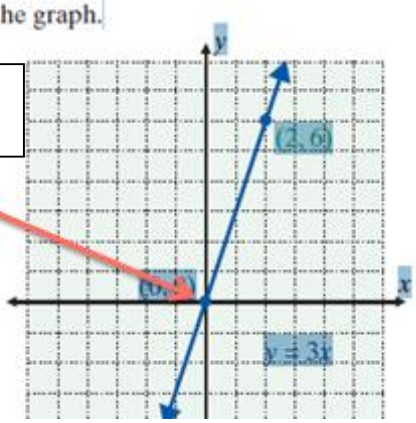
Example 3: Lines that Contain the Origin

Graph the linear equation $y = 3x$.

Solution: Locate two points on the graph.

When the x and y intercept are the point (0,0) then choose any other x value as an independent variable, calculate y, and plot the 2nd point.

x=0 so y=0
say x=2 then y=6



Graph horizontal and vertical lines

"crosses the axis at...."

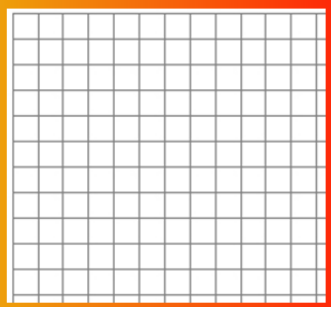
Graph: y = 1

Graph: x = -4

Student practice

Graph: y = -3

Graph: x = 2



Calculating Slope

Finding the slope using the formula:

Calculating the Slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

- Set up the formula format $\frac{\_}{\_}$
- Substitute the ordered pairs "x on the bottom, y on the top"
- Simplify
- Example: calculate the slope between (-1,5) and (4,-2)

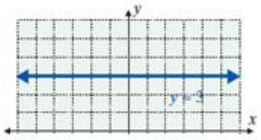
$$\frac{-2-5}{4-(-1)} = \frac{-7}{5}$$

Guided Practice: calculate the slope between (-1,-3) and (2,5)

- **Slope of vertical and horizontal lines**

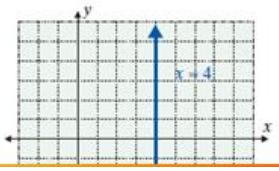
$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3-3}{5-(-2)} = \frac{0}{7} = 0$$

In fact, the numerator will always be 0 because the y-values will all be 3 regardless of the x-values. (See Figure 4.16.)



$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6-1}{4-4} = \frac{5}{0}, \text{ which is } \textbf{undefined}.$$

In fact, the denominator will always be 0 because the x-values will all be 4 regardless of the y-values. (See Figure 4.17.)



Slopes of parallel lines are equal
Slopes of perpendicular lines are opposite reciprocals

Graph using Slope-intercept method

Identify b the y-intercept and slope (direction & ratio of rise (or fall) & run (right) then Graph:

y=1/2x – 3

y= - 3x + 1

y = 4x - 3