

6.1b - Slope y-Intercept Form

Part 1: Graphing a Line Using the Slope and the y-Intercept:

Example 1: How can we graph $y = \frac{2}{3}x + 1$ without using a table of values?

a) The line $y = \frac{2}{3}x + 1$, has a slope: $\frac{2}{3}$ and y-intercept: 1

b) Plot the y-intercept on the given grid

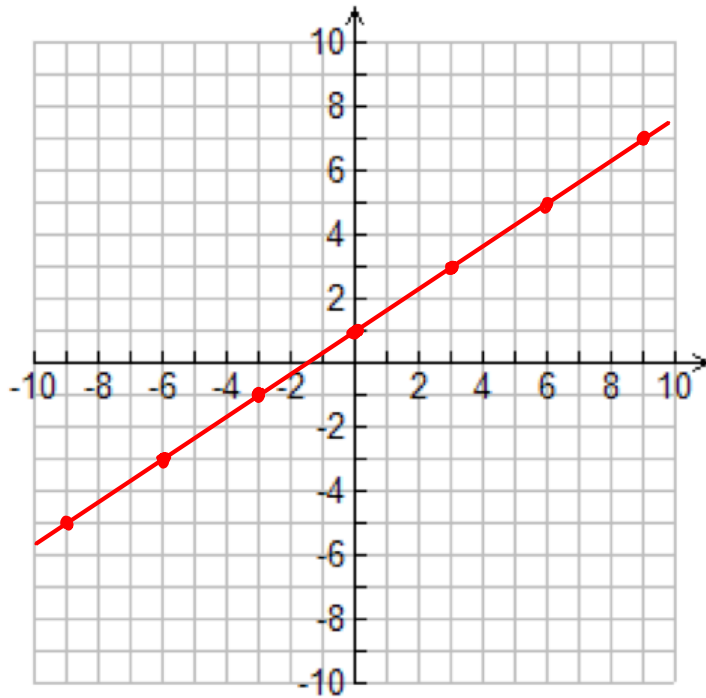
c) How can the slope be used to determine other points on this line?

Use the slope of $\frac{2}{3}$ which has a rise of 2 and a run of 3 to plot another point on the line.

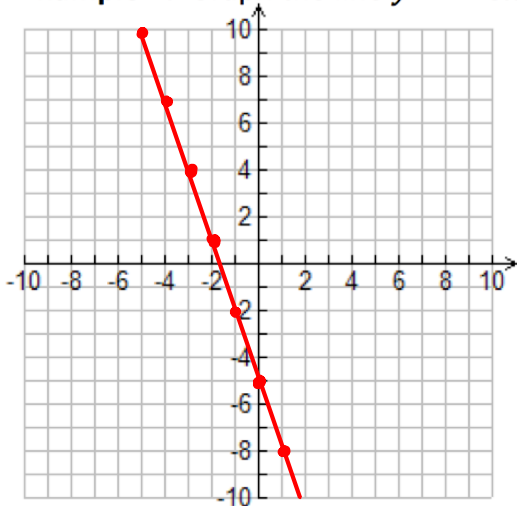
You could also use the opposite slope to plot points on the other side of the y-intercept.

The opposite slope, $\frac{-2}{-3}$, has a rise of -2 and a run of -3.

d) Use the slope to determine 2 other points on the line and draw in the line.



Example 2: Graph the line $y = -3x - 5$ using the slope and the y-intercept.



Slope: $m = -3 = \frac{-3}{1} = \frac{3}{-1}$

y-intercept: $b = -5$

Part 2: Find the Equation of a Line Graphically Given Two Points

Example 3:

a) Plot the points A(^{x_1} -5, ^{y_1} 3) and B(^{x_2} 8, ^{y_2} 3) on the given grid.

b) What is the y-intercept for the line that passes through A and B?

$$b = 3$$

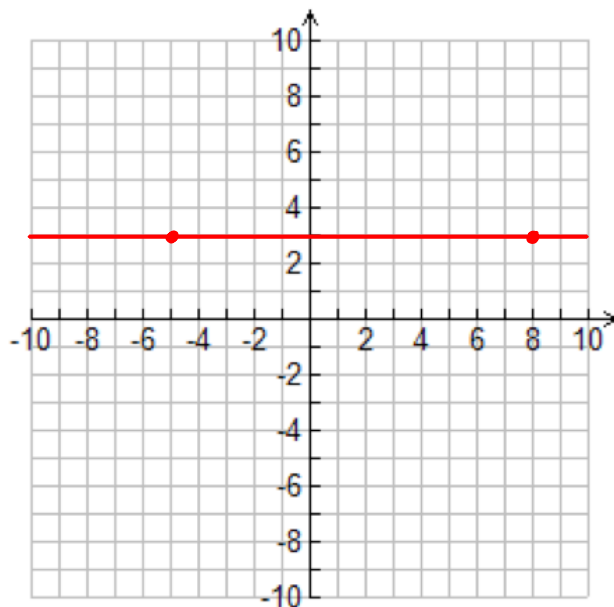
c) What is the slope for the line that passes through A and B?

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 3}{8 - (-5)} = \frac{0}{13} = 0$$

d) What is the equation for the line that passes through A and B?

$$y = 3$$

Note: the equation of a horizontal line is always in the form $y=b$. Every point on the line has a y-coordinate of 3.



Example 4: a) Plot the points $A(5, 8)$ and $B(5, -3)$ on the given grid.

b) What is the y-intercept for the line that passes through A and B?

No y-intercept.

x-intercept = 5

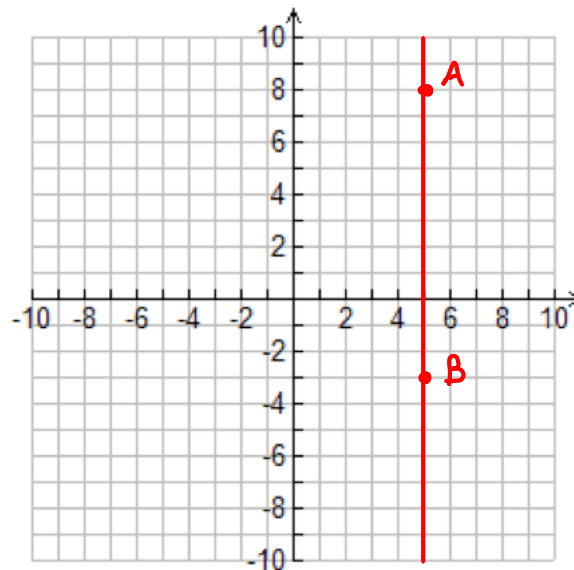
c) What is the slope for the line that passes through A and B?

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - 8}{5 - 5} = \frac{-11}{0} = \text{undefined}$$

d) What is the equation for the line that passes through A and B?

$$x = 5$$

Note: the equation of a vertical line is always in the form of $x =$ the x-intercept. Notice that every point on this line has an x-coordinate of 5.



Part 3: Consolidation

a) In general, a horizontal line has a slope that is zero and an equation of the form $y = b$ where 'b' is the y-intercept.

b) In general, a vertical line has a slope that is undefined and an equation of the form $x = a$ where 'a' is the x-intercept.

c) State the steps required to graph a line using the slope and the y-intercept:

1. Plot the y-intercept
2. Use the slope to plot points on either side of the y-intercept
3. Draw a straight line through the points you plotted.