

Slope-Intercept Form of a Line

Introduction

The slope-intercept form of the equation of a line is given by $y = mx + b$

Let's explore the effect of m and b on the graph of a line. Use your web browser to go to the "Slope-intercept form" activity:

<http://www.explorelearning.com/index.cfm?method=cResource.dspView&ResourceID=88>

Below are several questions designed to get you thinking about the activity. Answer them on a separate sheet of paper.

Activity

Finding the meaning of 'b'

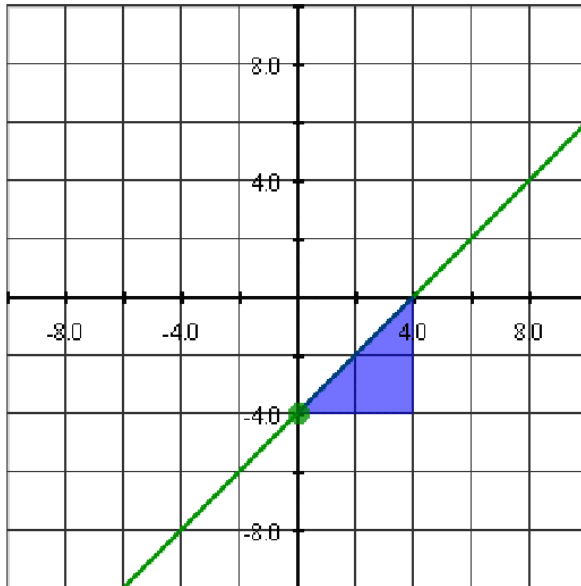
On the y axis of the graph is a green point. Drag the green point up the y -axis to the point $(0, 2)$. Notice the value of the slide bar labelled b . Now move the green point to $(0, -3)$ and take notice of the value of b .

Question 1a. What happens to the value of b as the line moves up and down?

Question 1b. If a line is defined by the equation $y = 3x - 7$, What would be the y -intercept?

Question 1c. If a line is defined by the equation $y = 5x + 2$, What would be the y -intercept?

Figure 1.



Question 1d. What is the value of **b** for the line graphed in figure 1?

Question 1e. What conjecture can you make about **b**?

The meaning of **m**

Use the **m** slide bar to experiment with different values of **m**.

Question 2a. As the values for **m** get large, does the line get 'steeper' or 'flatter'?

Question 2b. As the values for **m** get close to zero, does the line get 'steeper' or 'flatter'?

Figure 2.

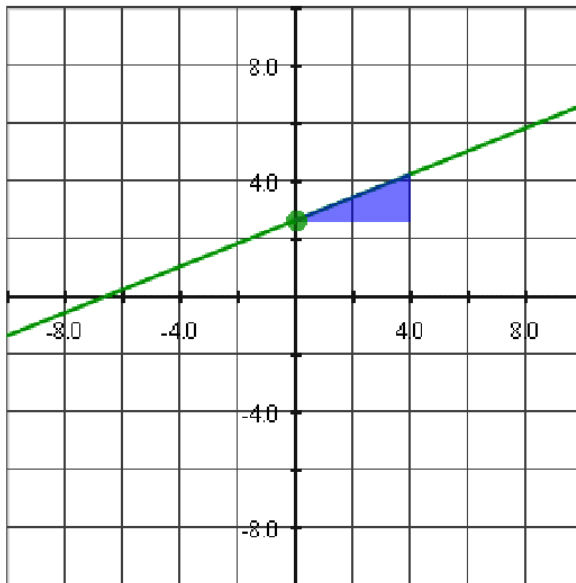
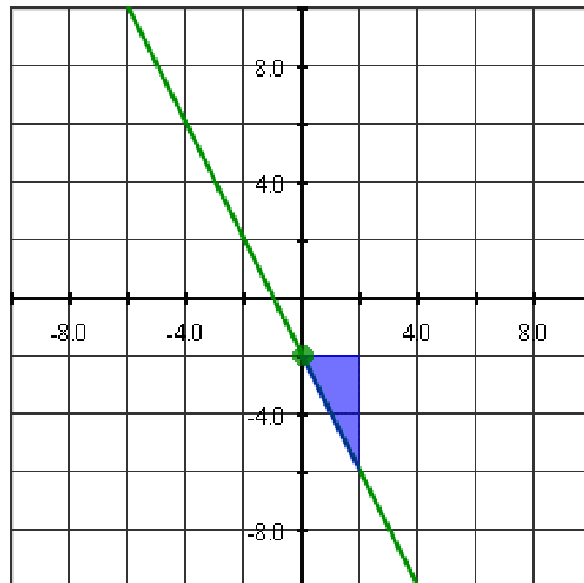


Figure 3.



Question 2c. In Figure 2, would the value of b be positive or negative? Why?

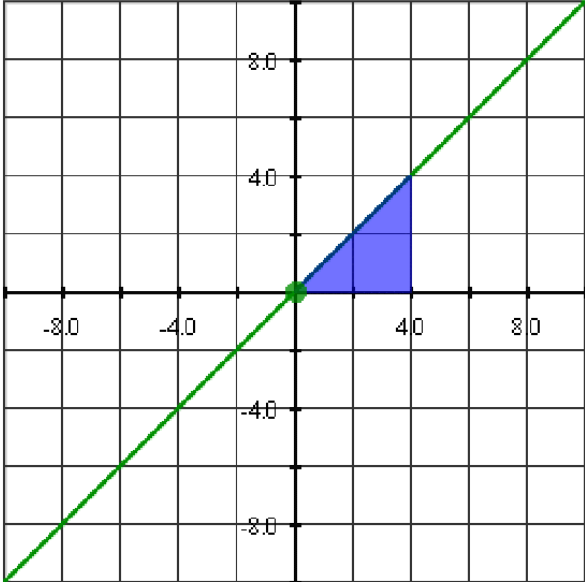
Question 2d. What is the value of b for the line in Figure 2?

Question 3e. What effect does the value of m have on the graph of a line?

Putting it all together

We have discovered that b is the y -intercept of a line and m is the slope of a line. Now let's use what we know about m and b to determine the equations of lines. Remember that the slope intercept equation for a line is $y = mx + b$.

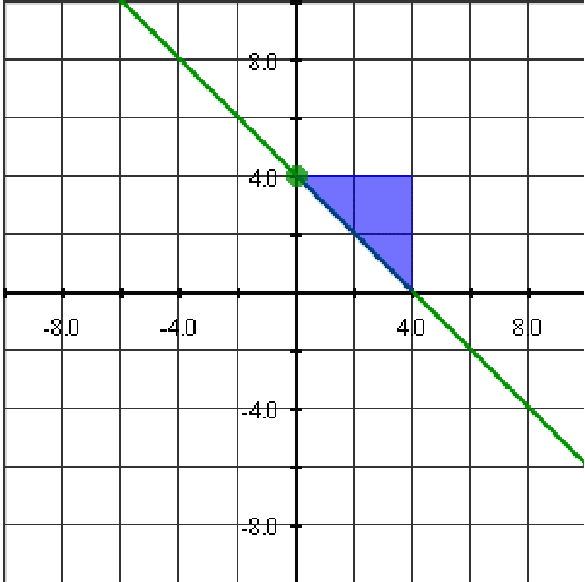
Below are the graphs of several lines. Determine the equation for each line. Check your answers by typing in the values for b and m beside each slide bar; then see if the graphs match up.



b = _____

m = _____

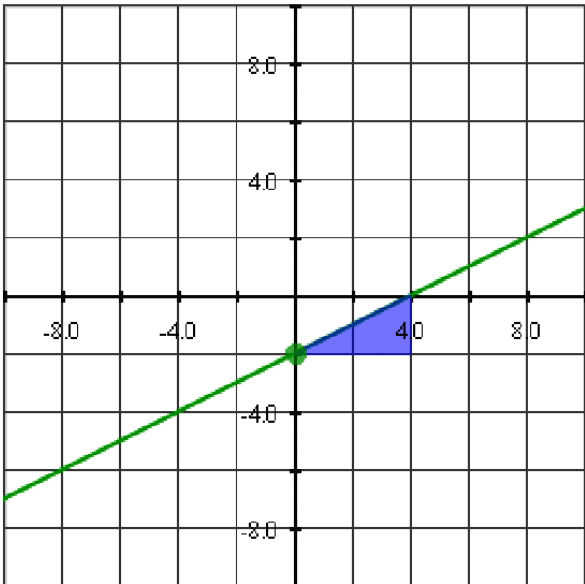
y = _____



b = _____

m = _____

y = _____



b = _____

m = _____

y = _____

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Conclusion

Lines can be defined given **m** and **b**. The value of **b** determines where a line crosses the y-axis. The value of **m** determines the slope of the line. Both can be put together to make an equation for the line: $y = mx + b$. This form of a linear equation is called the slope-intercept form. In subsequent activities, you will learn other methods of determining the equation for a line.