

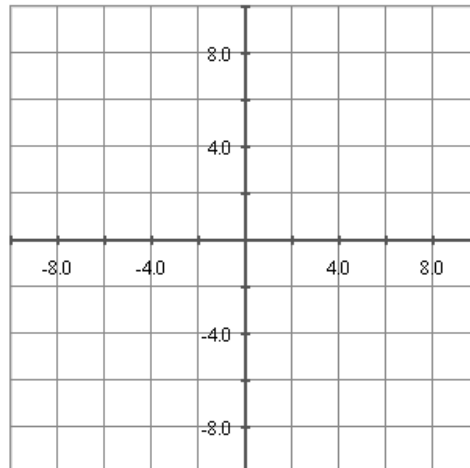
2. Set m to 2. (The quickest way to do this is to click on the value to the right of the slider, type 2, and press Enter.) Look at the steepness of the line. Then set m to 0.2.

a. How did the steepness of the line change?

b. Will the line become steeper or less steep if you increase the slope to 0.5? Use the Gizmo to check your answer.

c. Set $m = -2$. What does this line look like?

d. Sketch a line with $m = -0.5$ on the coordinate grid below. Then use the Gizmo to check your answer.



e. Set $m = 0$. What kind of line is this?

5. Turn on **Show Triangle** by clicking in the box. This will allow you to see the slope in rise over run form.
 - a. What does the triangle look like when the line is very steep?
 - b. What does the triangle look like when the slope of the line is very close to zero?
 - c. What is true of the rise and run when the slope is positive?
 - d. What is true of the rise and run when the slope is negative?
 - e. Drag the line so that it is perfectly vertical. What happened to the triangle? What is the slope now?
 - f. Can a vertical line be represented in slope-intercept form? Why or why not? Give an example of an equation in slope-intercept form of a line that would be almost vertical.

The y-intercept

In the slope-intercept form of the equation of a line, $y = mx + b$, b is the y-intercept of the line.

1. Vary the value of the y-intercept of the line using the b slider.
 - a. In which direction does the line move when b increases? When b decreases?
 - b. What is always true of the line when the y-intercept is positive?
 - c. What is always true of the line when the y-intercept is negative?
 - d. How does varying the y-intercept affect the slope of the line?
2. What is the y-intercept of the line $y = x + 2.3$? Write down your answer. Then check it by graphing the line using the Gizmo.

3. Set $b = -4$. Now vary the slope of the line using the m slider. On the graph, you can see many lines that have a y -intercept of -4 .
- a. Write down the slope-intercept equations of three different lines with a y -intercept of -4 . What do these equations have in common?

i.

ii.

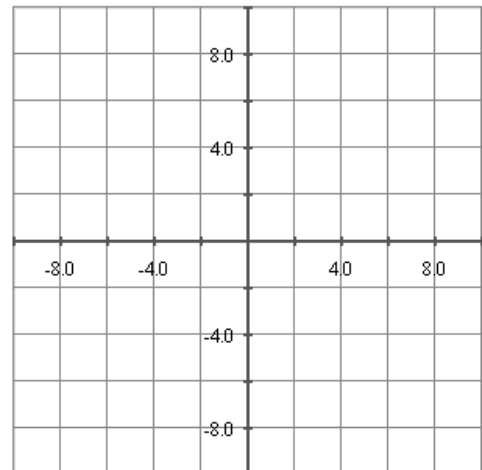
iii.

- b. Write down the slope-intercept equations of three different lines with a y -intercept of 1.5 . Sketch the graphs of these lines using different colors on the coordinate grid below. Use the Gizmo to check your answers.

i.

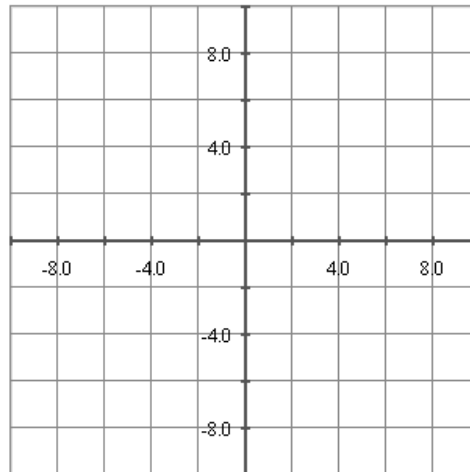
ii.

iii.



Putting it all Together

1. Sketch the graph of the line $y = 2x - 3$ on the coordinate grid below. Check your answer by typing in the appropriate values for m and b in the Gizmo. (Press Enter after typing in each value.)



2. Which of the following lines goes downwards from left to right? Circle your answer.
 - a. $y = 2x + 5$
 - b. $y = 2x - 6$
 - c. $y = 2x$
 - d. $y = -2x + 20$

Lines that go downwards from left to right have negative slopes. In the slope-intercept form, $y = mx + b$, m represents the slope of the line. Therefore, the line $y = -2x + 20$ has a slope of -2 , and will go downwards from left to right.

3. Which line is horizontal? Circle your answer.

- a. $y = 2$
- b. $y = 2x$
- c. $y = -2x$
- d. $y = x$

Horizontal lines have slopes of 0. In the slope-intercept form, $y = mx + b$, m represents the slope of the line. $y = 2$ can also be written as the equivalent equation $y = 0x + 2$. Therefore, $y = 2$ has a slope of 0.

4. Which line passes through the origin? Circle your answer.

- a. $y = 3$
- b. $y = x - 3$
- c. $y = -3x$
- d. $y = 2x + 1$

$y = -3x$. Any line in the form $y = mx$ has a y-intercept of 0, and will therefore pass through the origin.

5. What is the equation of a line with a y-intercept at (0, 6) and a slope of 3? Circle your answer.

- a. $y = 3x + 6$
- b. $y = 6x + 3$
- c. $y = 3x - 6$
- d. $y = -6x - 3$

In the slope-intercept form, $y = mx + b$, m represents the slope of the line and b represents the y-intercept. Substituting $m = 3$ and $b = 6$ into the slope-intercept form results in $y = 3x + 6$.