

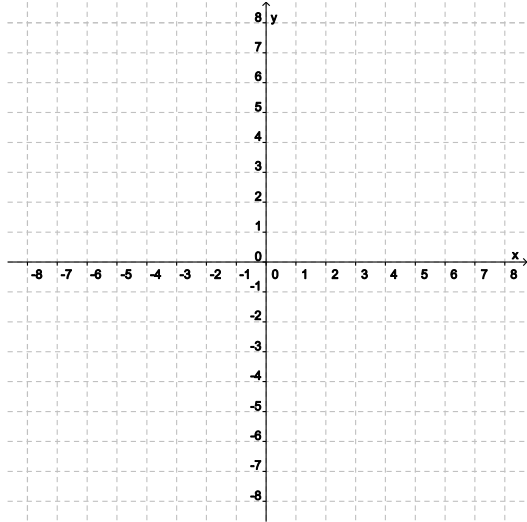
## Writing and Graphing Equations of Lines

### How to graph a line $y = mx + b$

1. Plot the  $y$ -intercept  $(0, b)$ .
2. Use the slope to get another point (remember, slope is rise over run).
3. Draw the line.

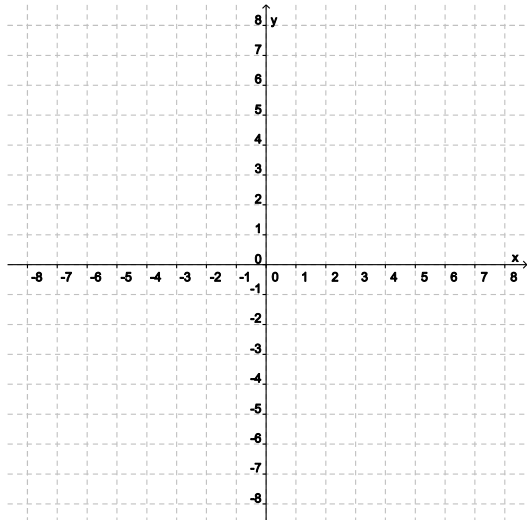
### Ex 1.

Find the slope and  $y$ -intercept of the line  $y = -\frac{3}{5}x - 2$ . Then graph the line.



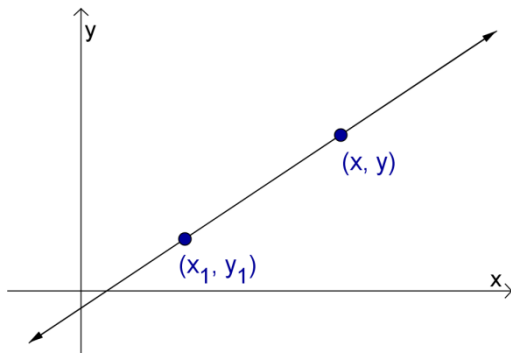
### Ex 2.

Find the slope and  $y$ -intercept of the line  $y = -2x$ . Then graph the line.



### Ex 3.

Write an equation of the line with slope  $\frac{2}{3}$  and  $y$ -intercept  $(0, -1)$ .



Suppose we know a point on a line is  $(x_1, y_1)$ , and the slope of that line is  $m$ . Then any other point on the line  $(x, y)$  must satisfy the following equation:

We can rewrite this to get the \_\_\_\_\_  
of the equation of a line:

So, if we know a \_\_\_\_\_ on a line, and the \_\_\_\_\_ of the line, we can use point-slope form to get an equation of the line.

**Ex 4.**

Write the point-slope form of the equation of the line with slope 3 that passes through the point  $(1, -4)$ .

Now write the equation in slope-intercept form.

**Ex 5.**

A line passes through the points  $(3, -2)$  and  $(1, 4)$ . Find an equation of the line in point-slope form.

**Ex 6.**

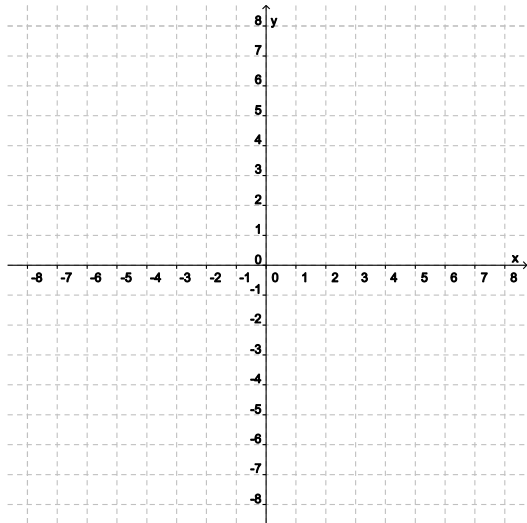
Write the equation of the line passing through  $(3, -5)$  and perpendicular to the line whose equation is  $-3x + y = 1$ . Express the equation in point-slope form and slope-intercept form.

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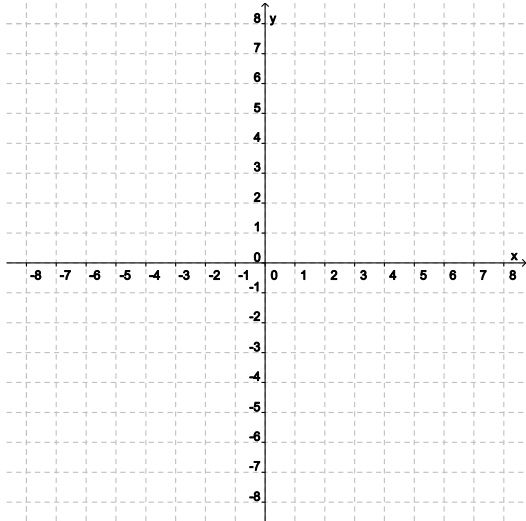
**Practice**

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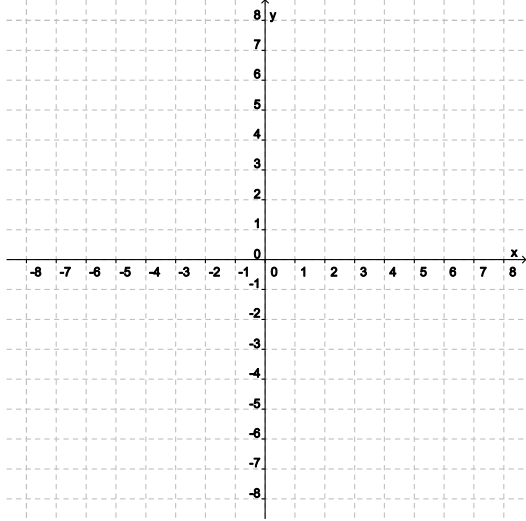
1. Find the slope and y-intercept of the line  $y = \frac{x}{4} - 2$ . Then graph the line.



2. Find the slope and y-intercept of the line  $y = -x + 5$ . Then graph the line.



3. Write an equation of the line with slope  $\frac{2}{3}$  and y-intercept  $(0, -1)$ . Then graph the line.



4. Write the point-slope form of the equation of the line with slope  $-3$  that passes through the point  $(-2, 4)$ . Then write the equation in slope-intercept form.

5. Write an equation of the line that is parallel to  $5x - y = 10$  and has y-intercept  $(0, -2)$ .

Q: How can half of 12 be 7?