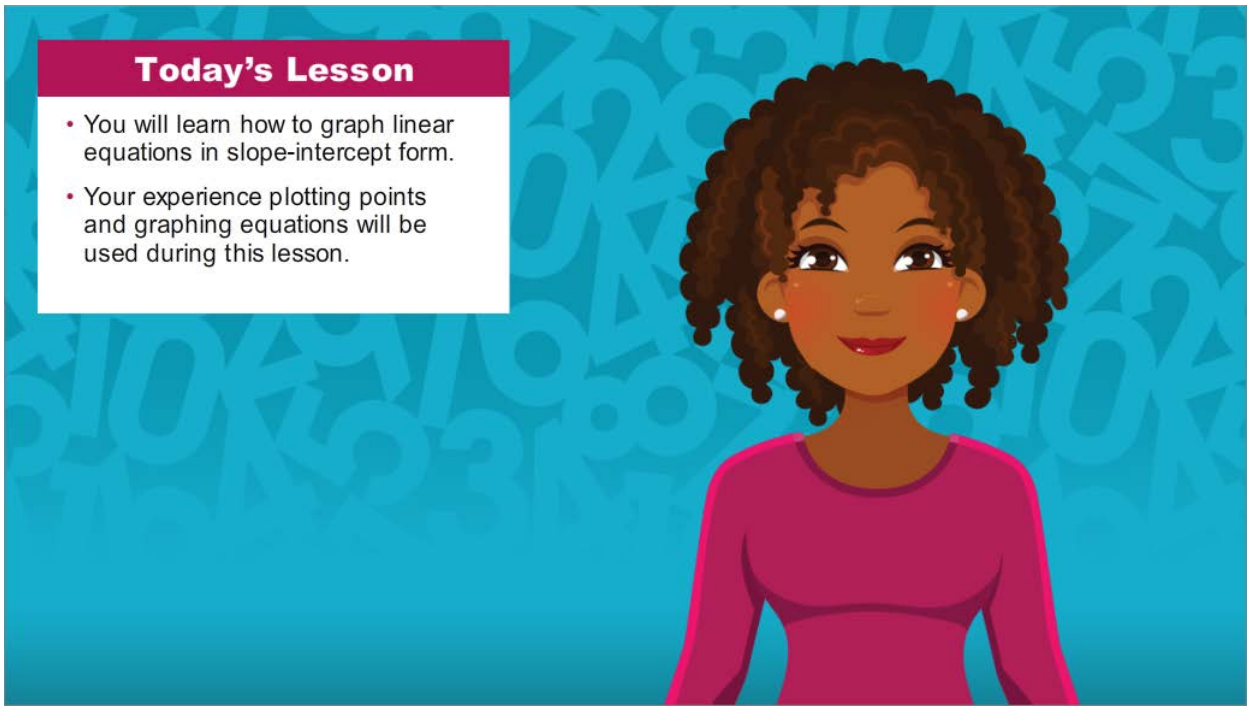
Module 8: Graphing Linear Equations

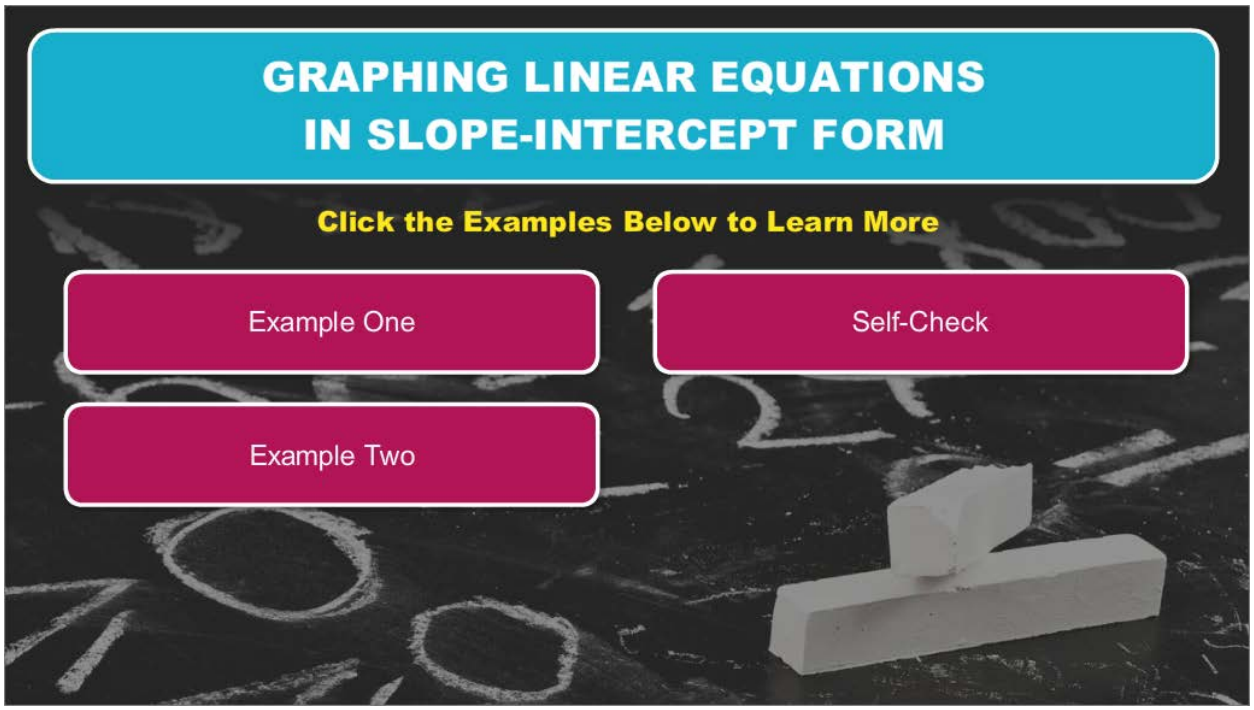
Topic 1 Content: Graphing Linear Equations in Slope-Intercept Form

Introduction



Hi there! I'm so glad to have you here for this lesson in Algebra I, where you will learn how to graph linear equations in slope-intercept form. Your prior experiences plotting points and graphing equations will prove useful during this lesson.

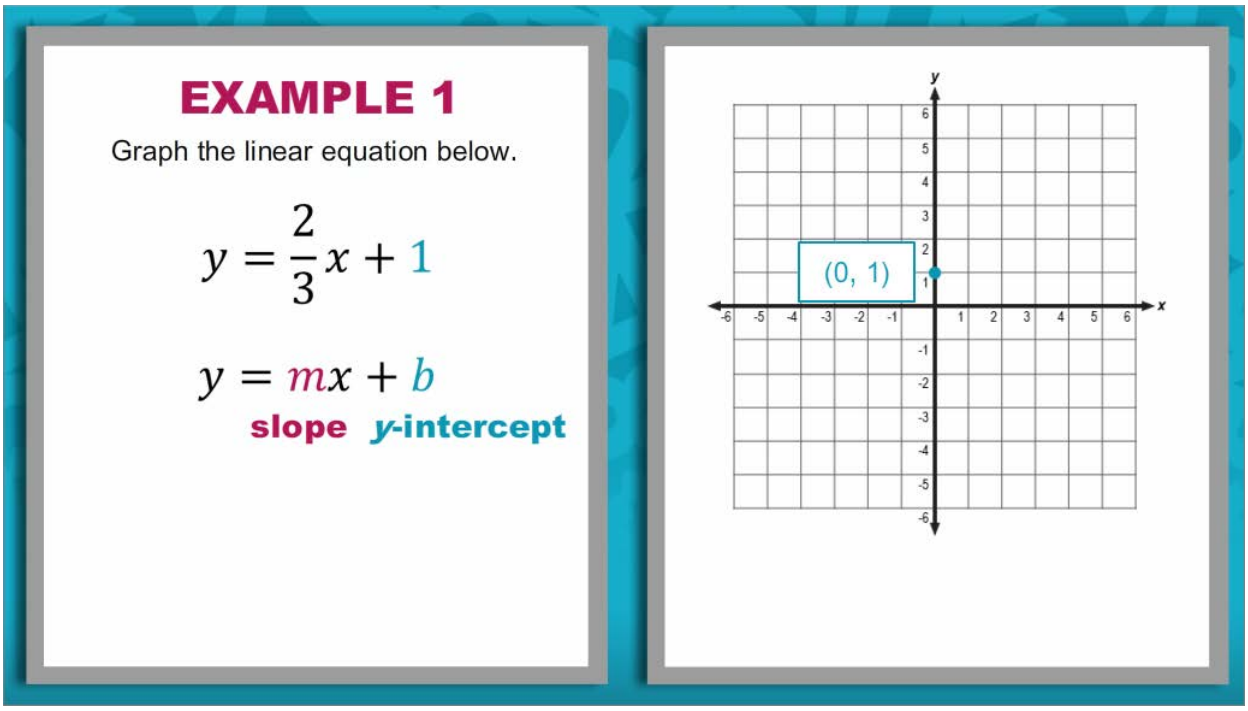
Graphing Linear Equations in Slope-Intercept Form



Click the examples below to learn more.

- Example One
- Example Two
- Self-Check

Example 1



Graph the linear equation below:

$$y = \frac{2}{3}x + 1$$

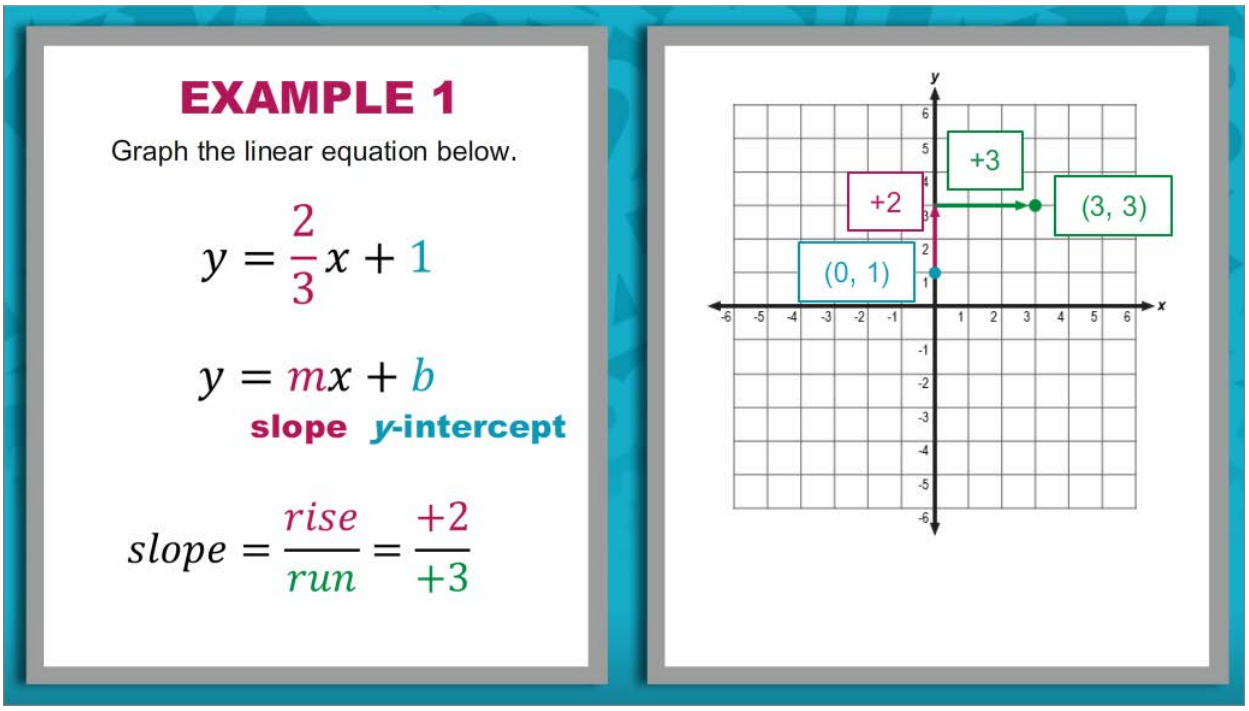
When an equation is given in slope-intercept form, the slope is m, the coefficient of x, and b is the y-intercept.

Slope-intercept form: $y = mx + b$

$y = \frac{2}{3}x + 1$

To graph the line $y = \frac{2}{3}x + 1$ begin by plotting the y-intercept. In this example, b equals 1. So plot the ordered pair $(0, 1)$.

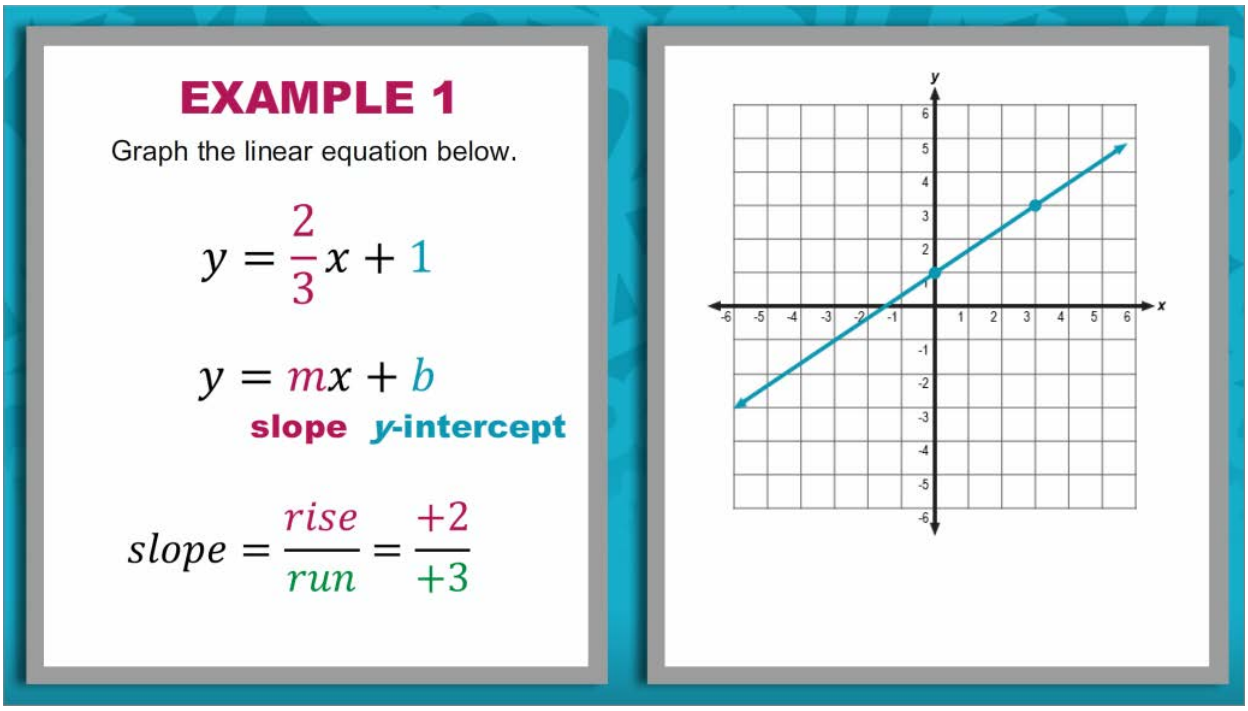
Example 1 (continued)



$$y = \frac{2}{3}x + 1$$

After you have plotted the y-intercept, use the slope to find another point on the line. In this example, the slope is $\frac{2}{3}$. Recall that slope represents a constant rate of change; it is a ratio of the change in y over the change in x. It is often described as $\frac{rise}{run}$. To use the slope to plot another point on the line, begin at the y-intercept $(0, 1)$. Then move 2 units up and 3 units to the right. The point where you end is another point on the line: $(3, 3)$.

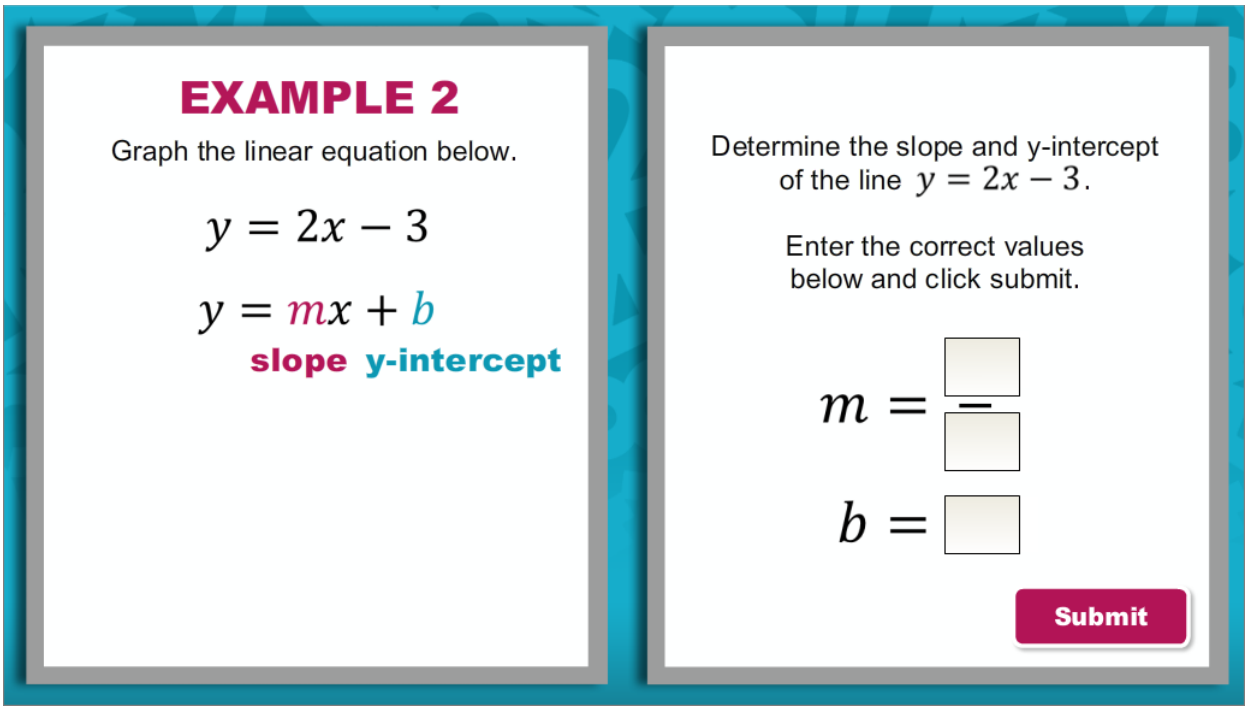
Example 1 (continued)



$$y = \frac{2}{3}x + 1$$

Lastly, draw a line that passes through the two points. Your work is complete. You have graphed the line $y = \frac{2}{3}x + 1$.

Example 2



Graph the linear equation below:

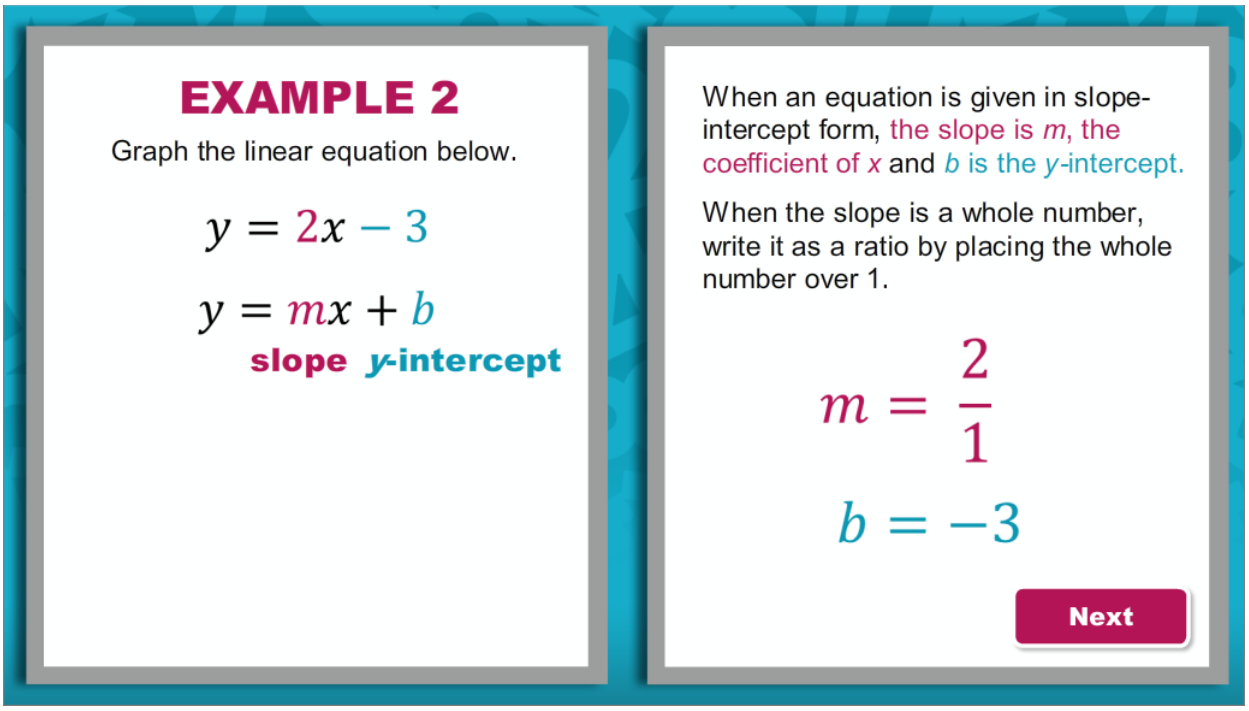
$$y = 2x - 3$$

The first step to graphing the line $y = 2x - 3$ is to identify the slope and the y-intercept. Recall that when an equation is in slope-intercept form, $y = mx + b$, the slope is m and b is the y-intercept.

Determine the slope and y-intercept of the line $y = 2x - 3$. Enter the correct values below and click submit.

$m = \frac{?}{?}$
$b = ?$

Example 2 (continued)



$$y = mx + b$$
$$y = 2x - 3$$

When an equation is given in slope-intercept form, the slope is m, the coefficient of x and b is the y-intercept.

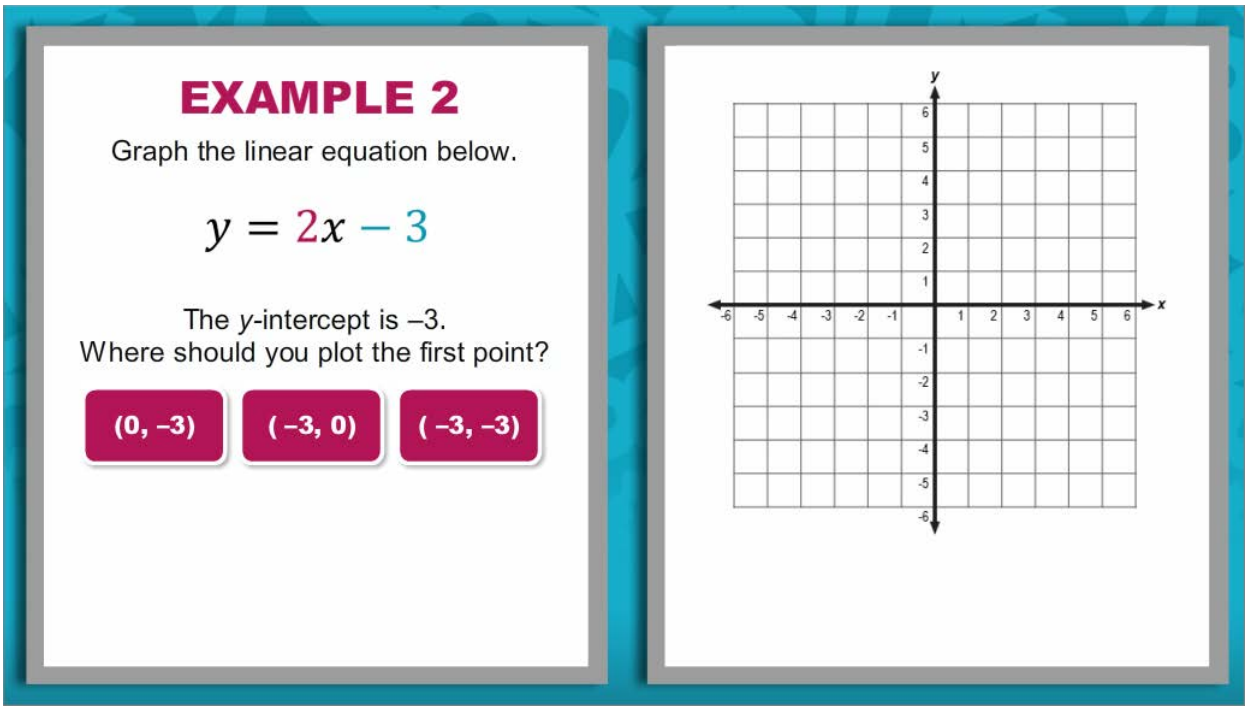
When the slope is a whole number, write it as a ratio by placing the whole number over 1.

$m = \frac{2}{1}$

The y-intercept is -3.

$b = -3$

Example 2 (continued)



$$y = 2x - 3$$

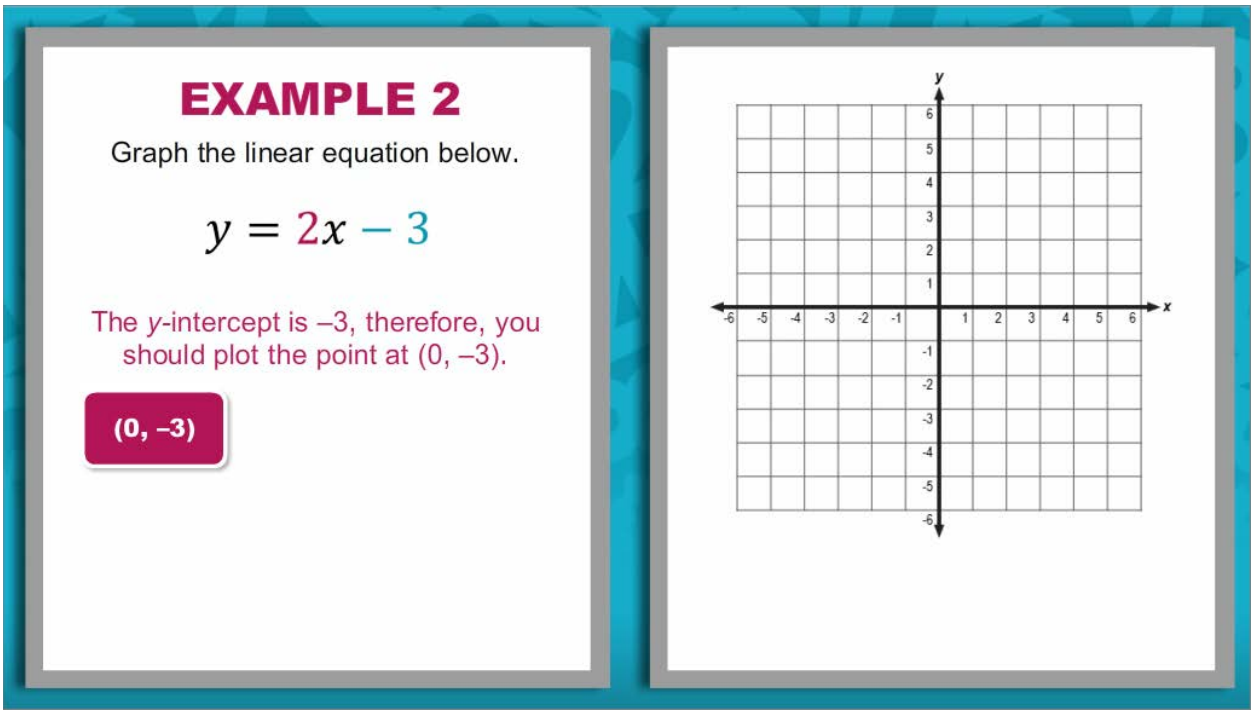
Now it's time to begin graphing the line $y = 2x - 3$.

The *y*-intercept is -3.

Where should you plot the first point?

A) $(0, -3)$
B) $(-3, 0)$
C) $(-3, -3)$

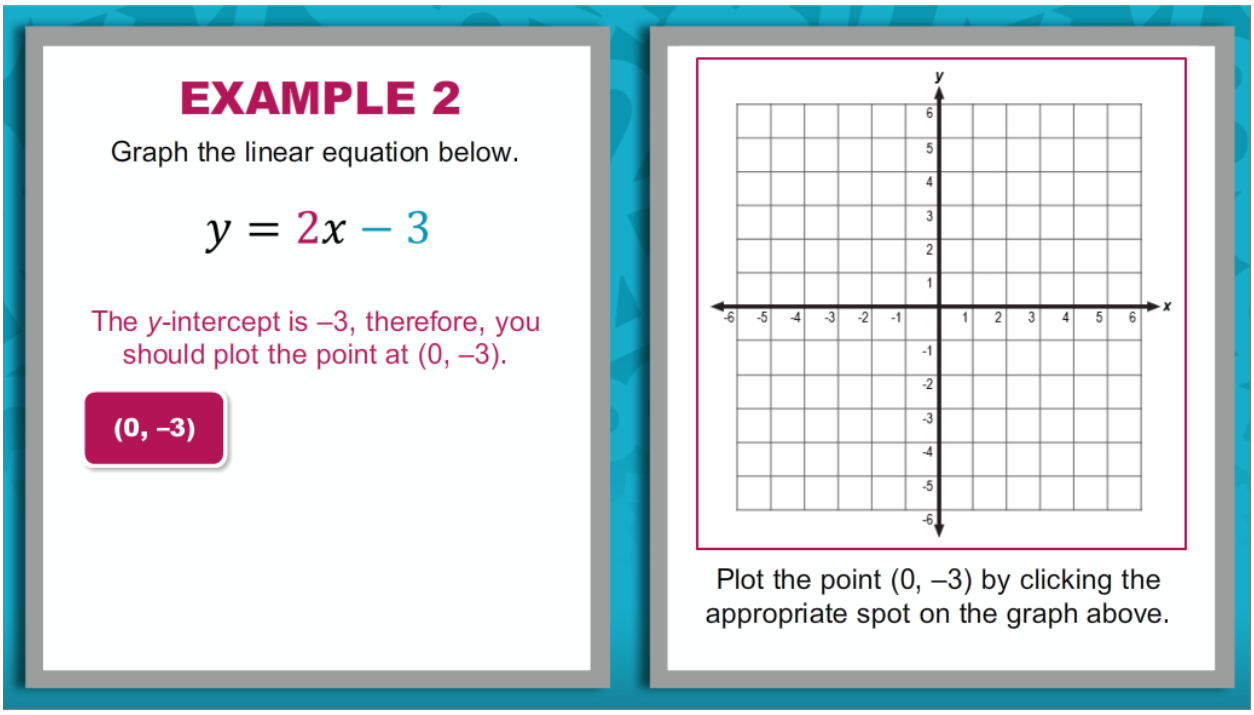
Example 2 (continued)



$$y = 2x - 3$$

The y-intercept is -3. Therefore, you should plot a point at $(0, -3)$.

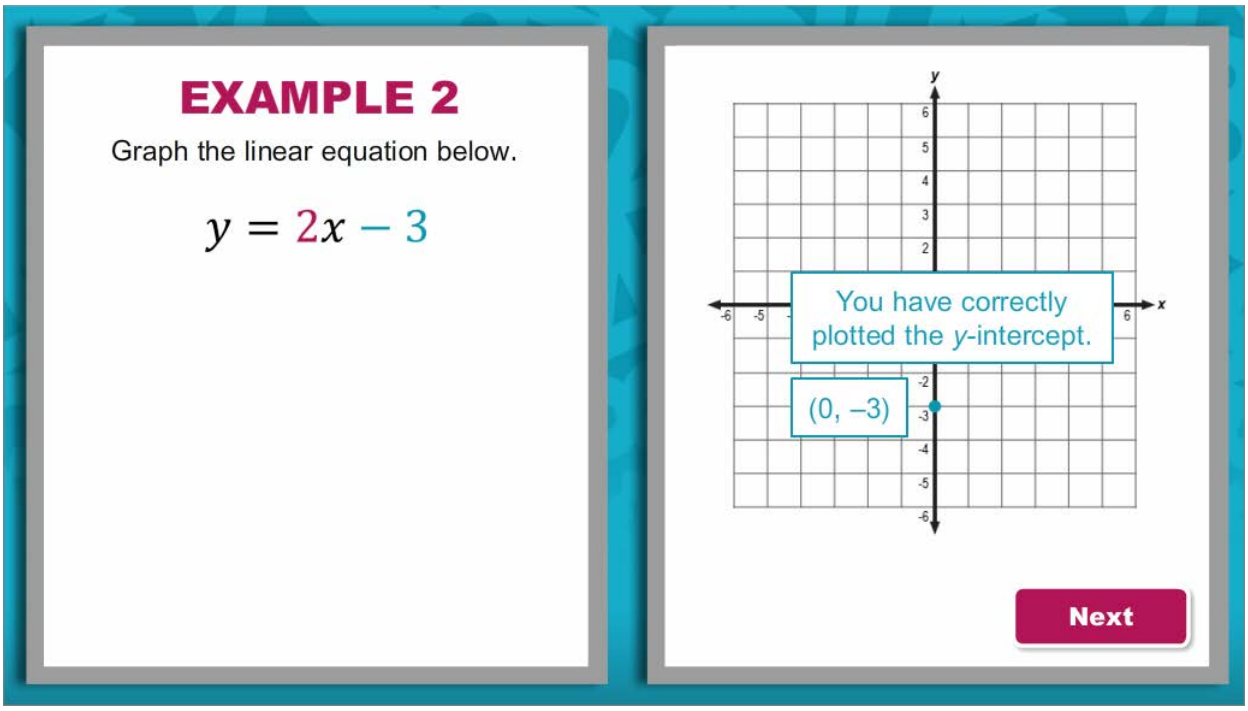
Example 2 (continued)



$$y = 2x - 3$$

Plot the point $(0, -3)$ by clicking the appropriate spot on the graph above.

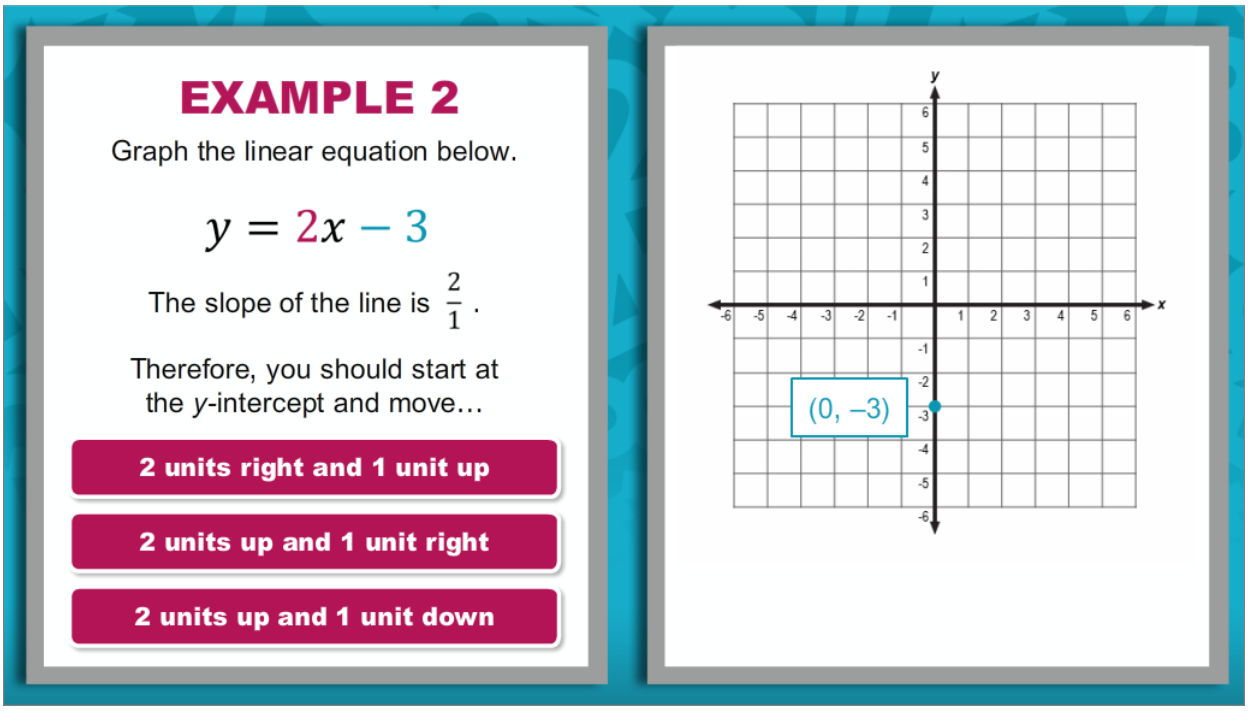
Example 2 (continued)



$y = 2x - 3$

You have correctly plotted the y-intercept $(0, -3)$.

Example 2 (continued)



$$y = 2x - 3$$

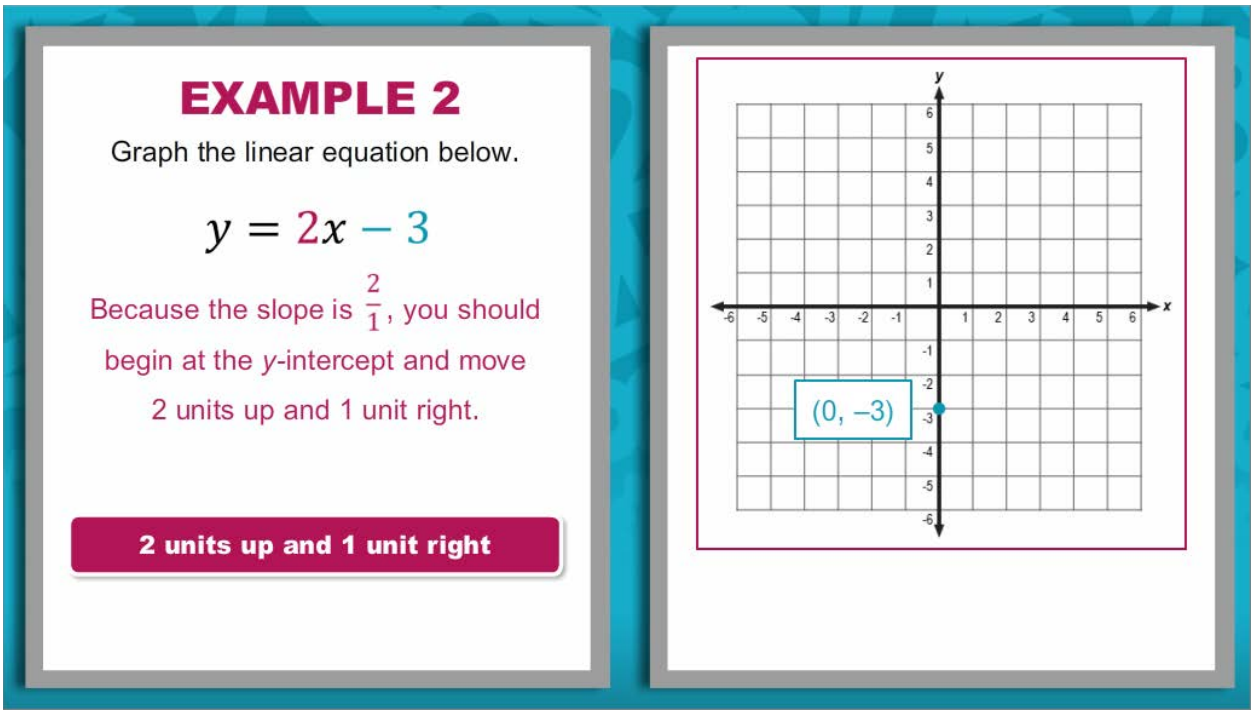
Next, use the slope to plot a second point.

Recall that slope can be described as $\frac{rise}{run}$.

The slope of the line is $\frac{2}{1}$. Therefore, you should start at the *y*-intercept and move…

A) 2 units right and 1 unit up
B) 2 units up and 1 unit right
C) 2 units up and 1 unit down

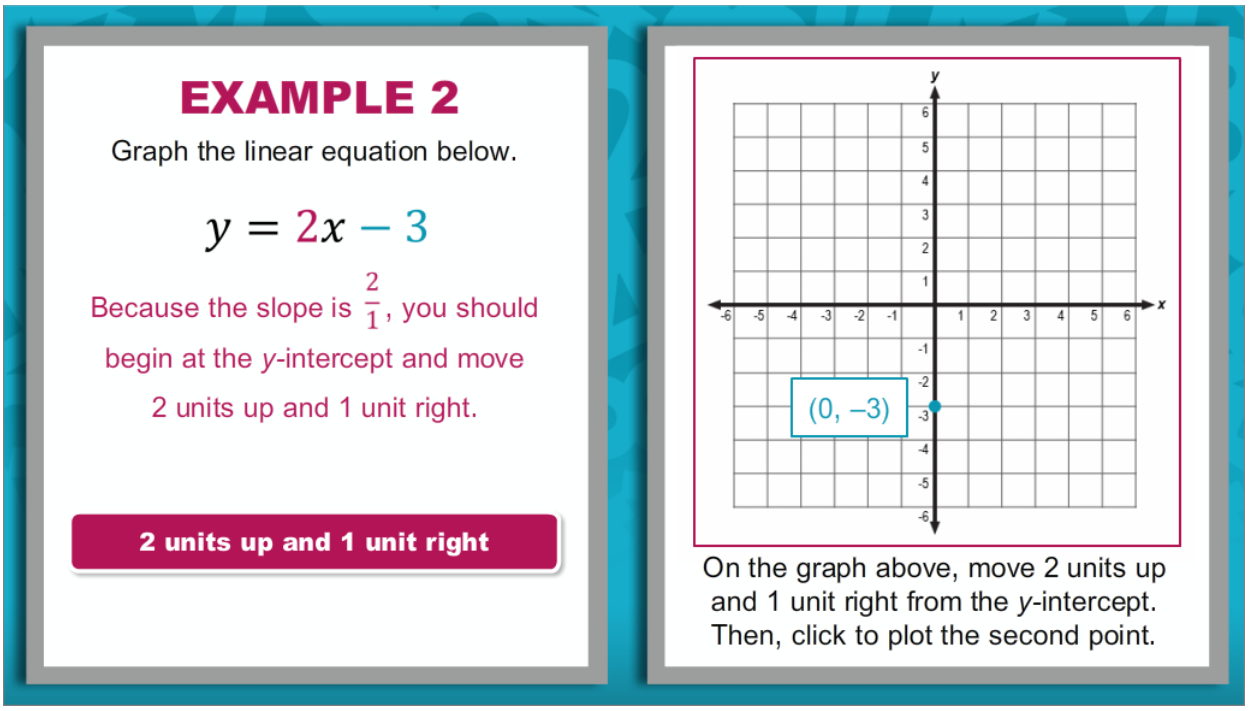
Example 2 (continued)



$$y = 2x - 3$$

Because the slope is $\frac{2}{1}$, you should begin at the *y*-intercept and move 2 units up and 1 unit right.

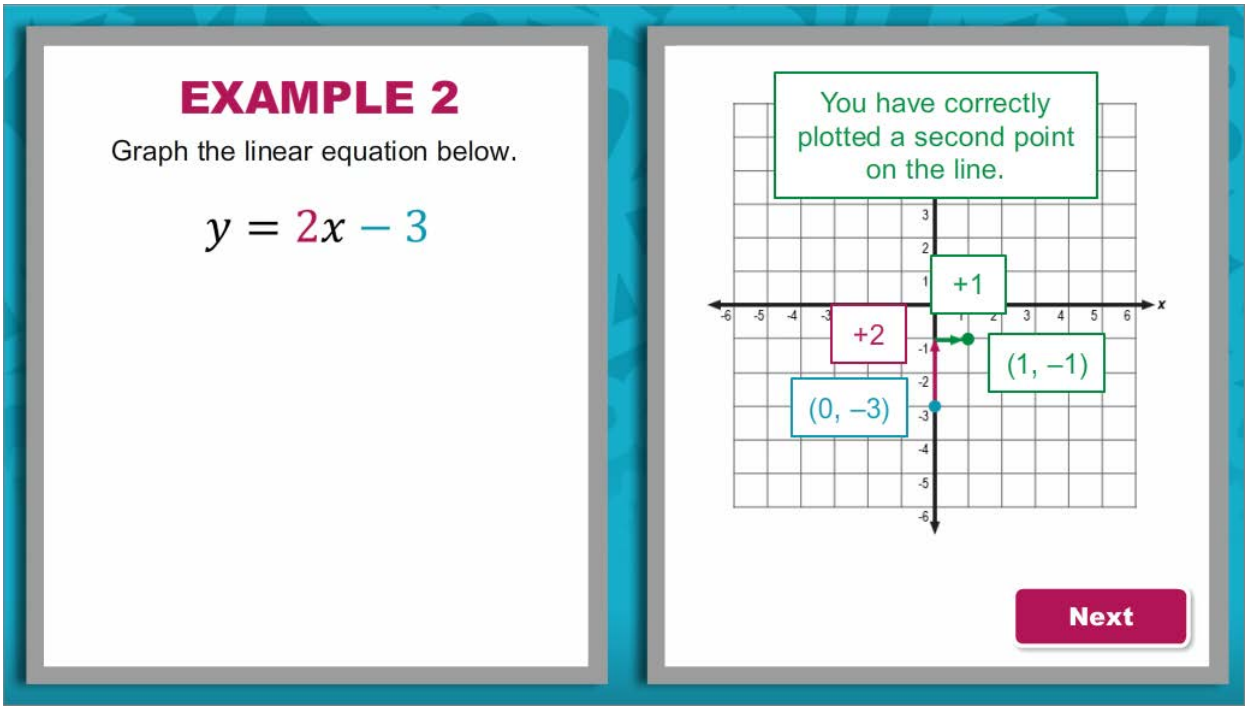
Example 2 (continued)



$$y = 2x - 3$$

On the graph above, move 2 units up and 1 unit right from the *y*-intercept. Then, click to plot the second point.

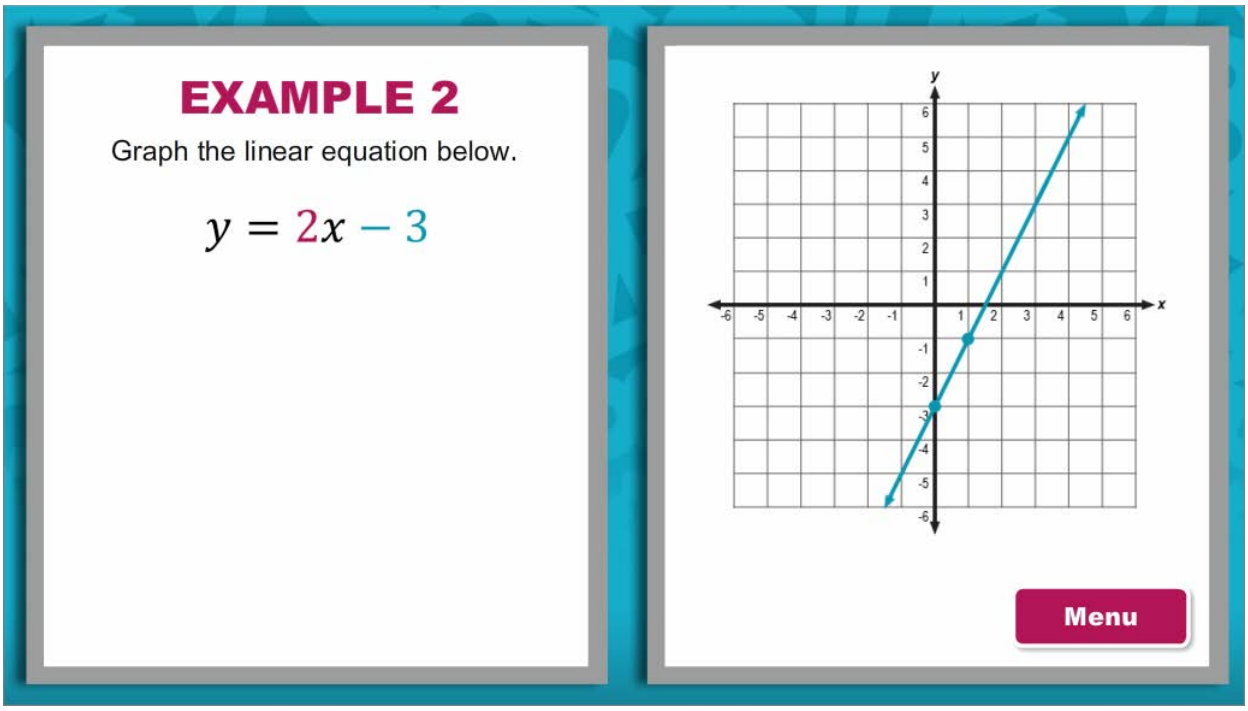
Example 2 (continued)



$y = 2x - 3$

You have correctly plotted a second point of the line $(1, -1)$.

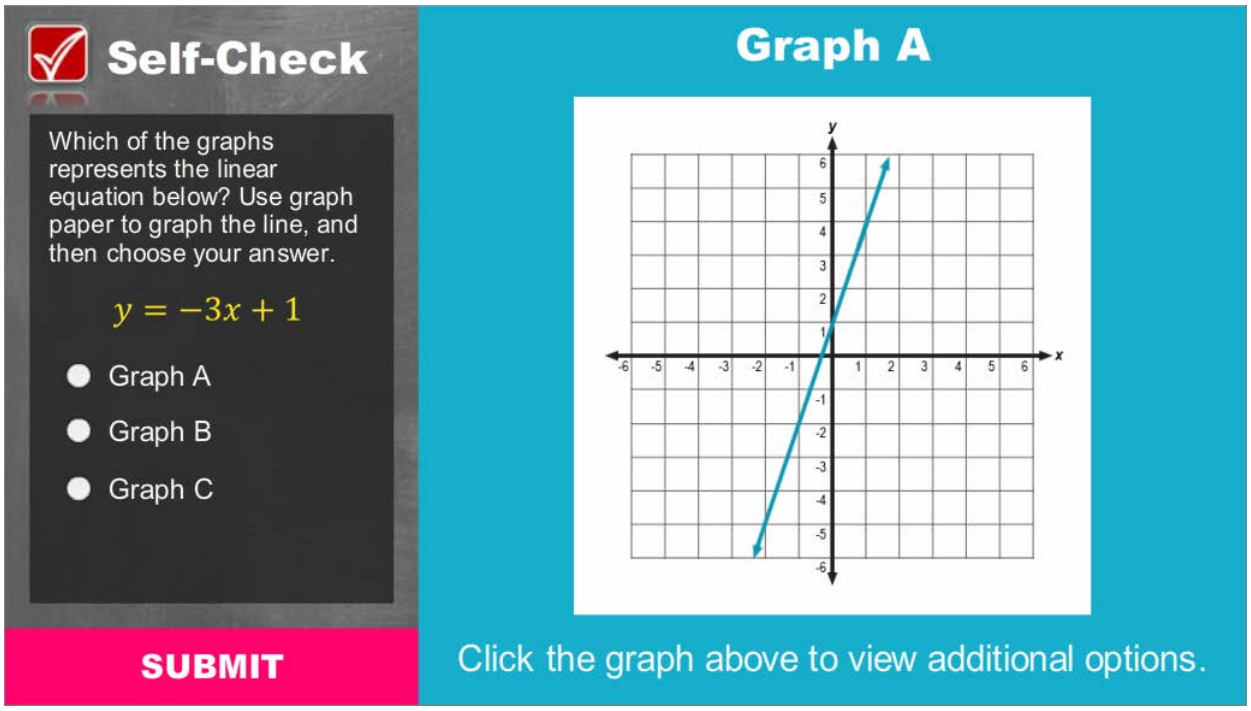
Example 2 (continued)



$$y = 2x - 3$$

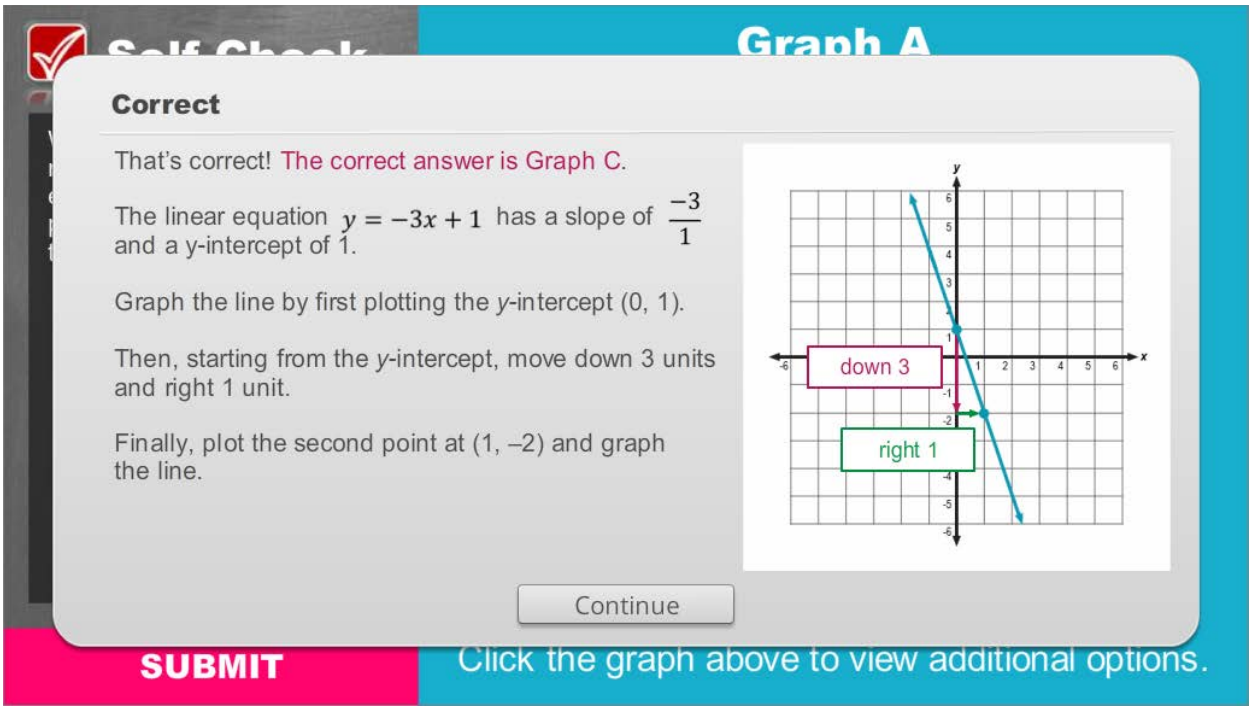
The last step is to draw the line that passes through the two points you plotted. Your work is complete. You have graphed the line $y = 2x - 3$.

Self-Check



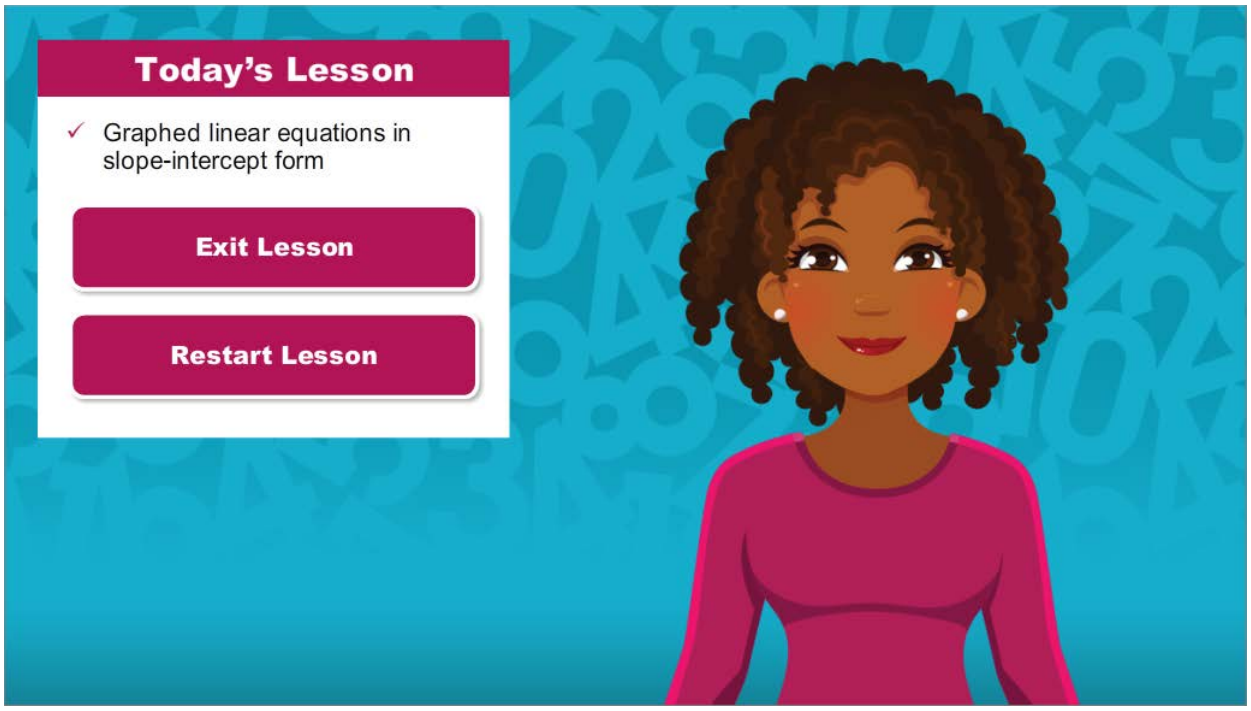
Solve the problem in the image above to check your understanding of the content.

Self-Check: Answer



For your reference, the image above shows the correct solution to the self-check problem.

Conclusion



You have reached the conclusion of this lesson where you learned how to graph linear equations in slope-intercept form.