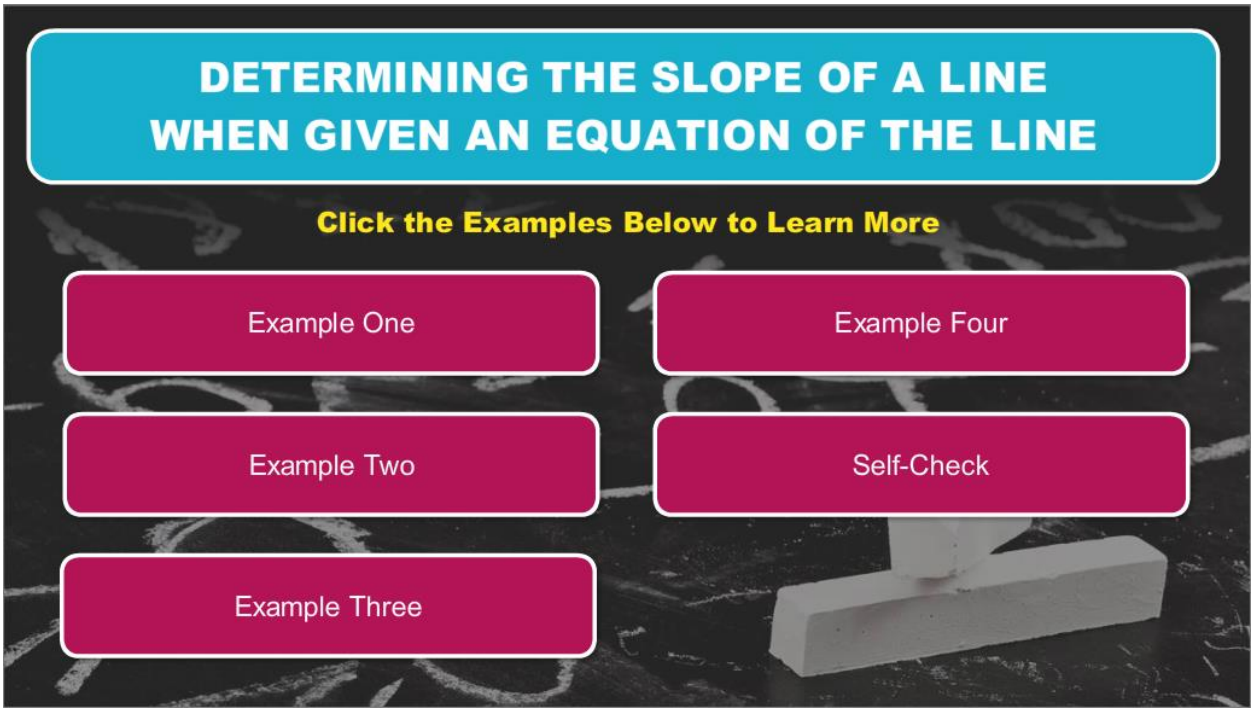
# Module 9: Writing Linear Equations

## Topic 1 Content: Determining the Slope of a Line When Given an Equation of the Line

### Introduction

Hi there! I'm so glad you could join me for this lesson in Algebra I, where you will learn how to determine the slope of a line when given its equation.

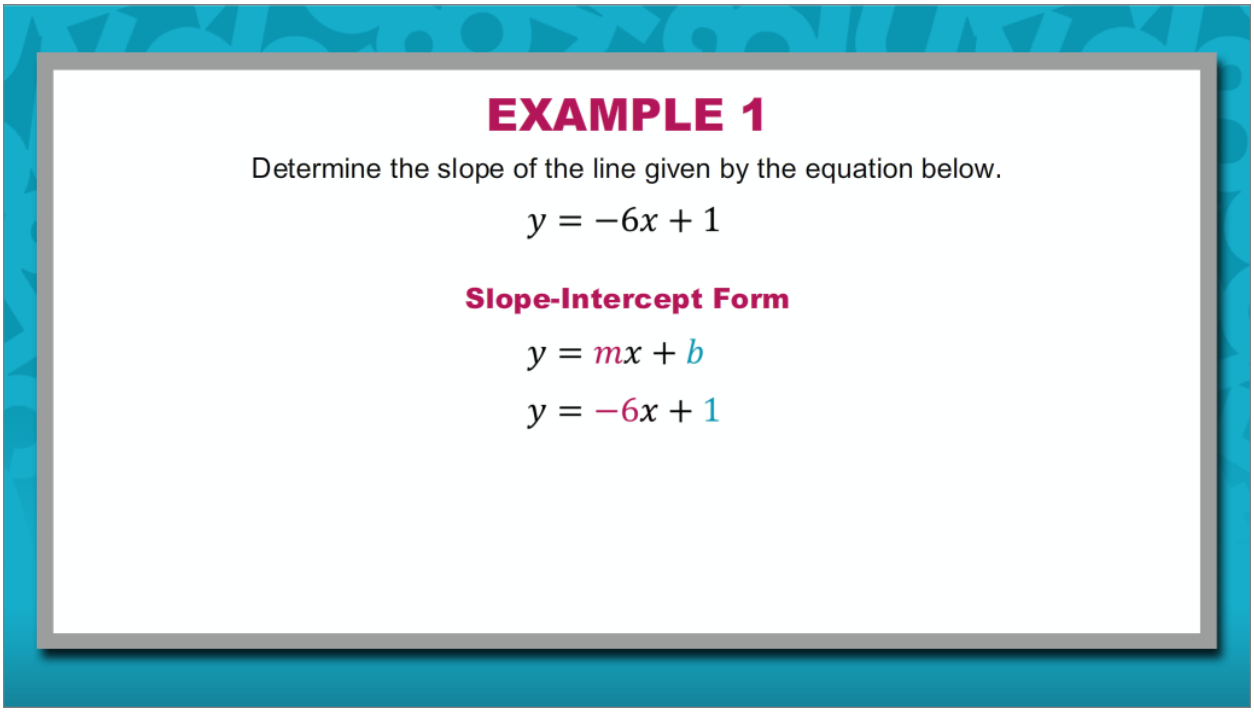
## Determining the Slope of a Line When Given an Equation of the Line




Click the examples below to learn more

- Example One
- Example Two
- Example Three
- Example Four
- Self-Check

## Example One




Determine the slope of the line given by the equation below.

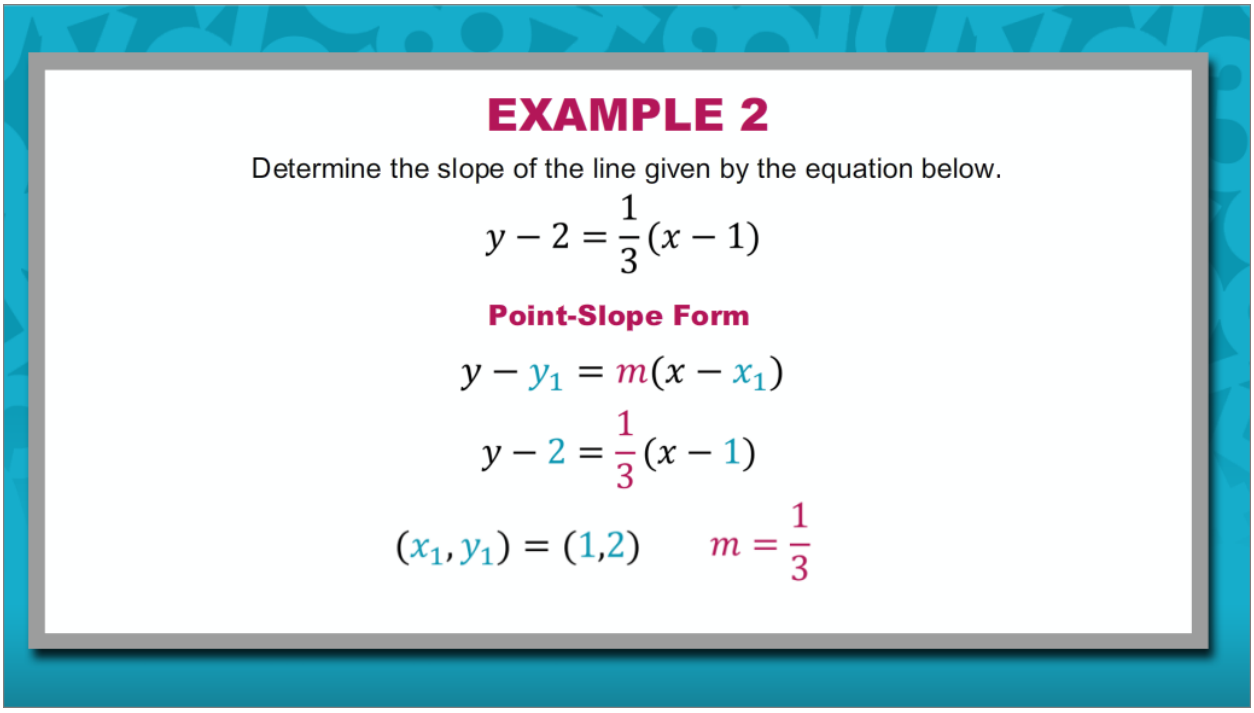
$$y = -6x + 1$$

The slope-intercept form of a linear equation is $y = mx + b$, where $m$ represents the slope of the line and $b$ represents the $y$-intercept of the line.

The linear equation $y = -6x + 1$ is in slope-intercept form. The slope of the line is $-6$ and the y-intercept is 1.

$$y = mx + b$$
$$y = -6x + 1$$

Example Two




Determine the slope of the line given by the equation below.

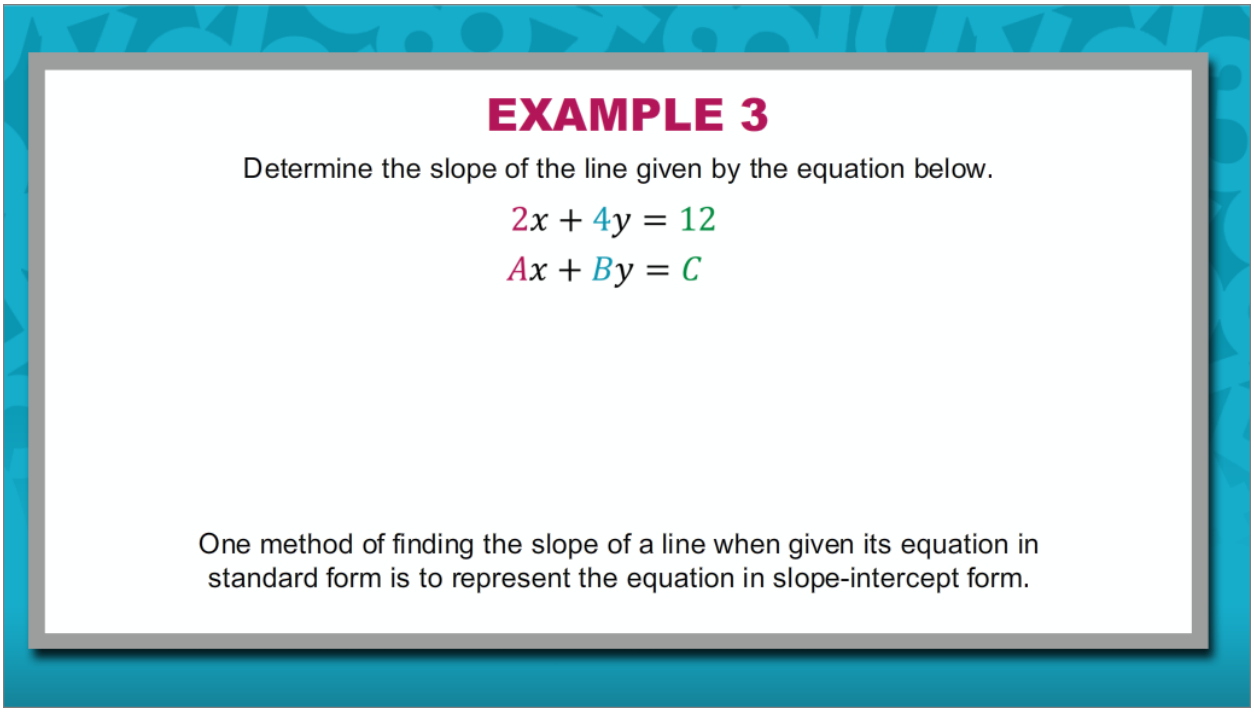
$$y - 2 = \frac{1}{3}(x - 1)$$

The point-slope form of a linear equation is $y - y_1 = m(x - x_1)$, where $m$ represents the slope of the line and $x_1$ and $y_1$ represent the coordinates of a point on the line.

The linear equation $y - 2 = \frac{1}{3}(x - 1)$ is in point-slope form. The line passes through the point $(1, 2)$ and has a slope of $\frac{1}{3}$.

$$y - y_1 = m(x - x_1)$$
$$y - 2 = \frac{1}{3}(x - 1)$$
$$(x_1, y_1) = (1, 2)$$
$$m = \frac{1}{3}$$

## Example Three




Determine the slope of the line given by the equation below.

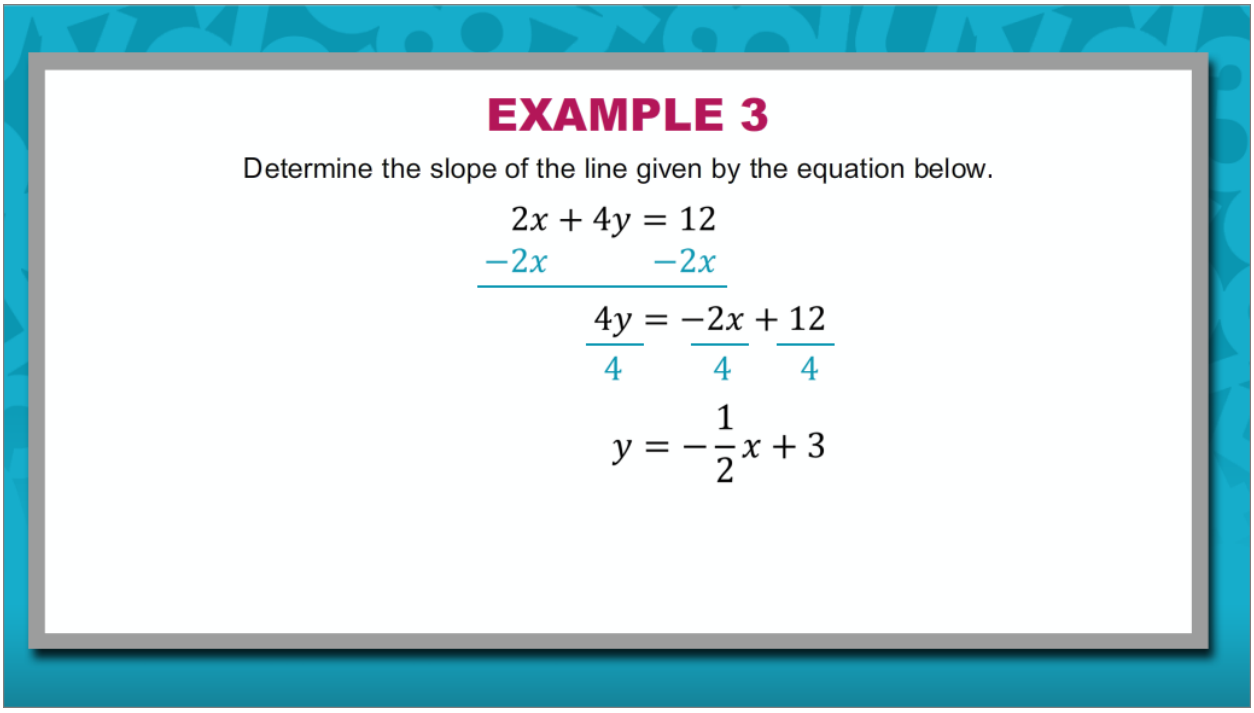
$$2x + 4y = 12$$

The linear equation in this example is given in standard form: $Ax + By = C$, where $A$, $B$, and $C$ are integers and $A$ and $B$ are not both equal to 0.

One method of finding the slope of a line when given its equation in standard form is to represent the equation in slope-intercept form. To do this, solve the given equation for $y$.

$$Ax + By = C$$
$$2x + 4y = 12$$

Example Three (continued)




Determine the slope of the line given by the equation below.

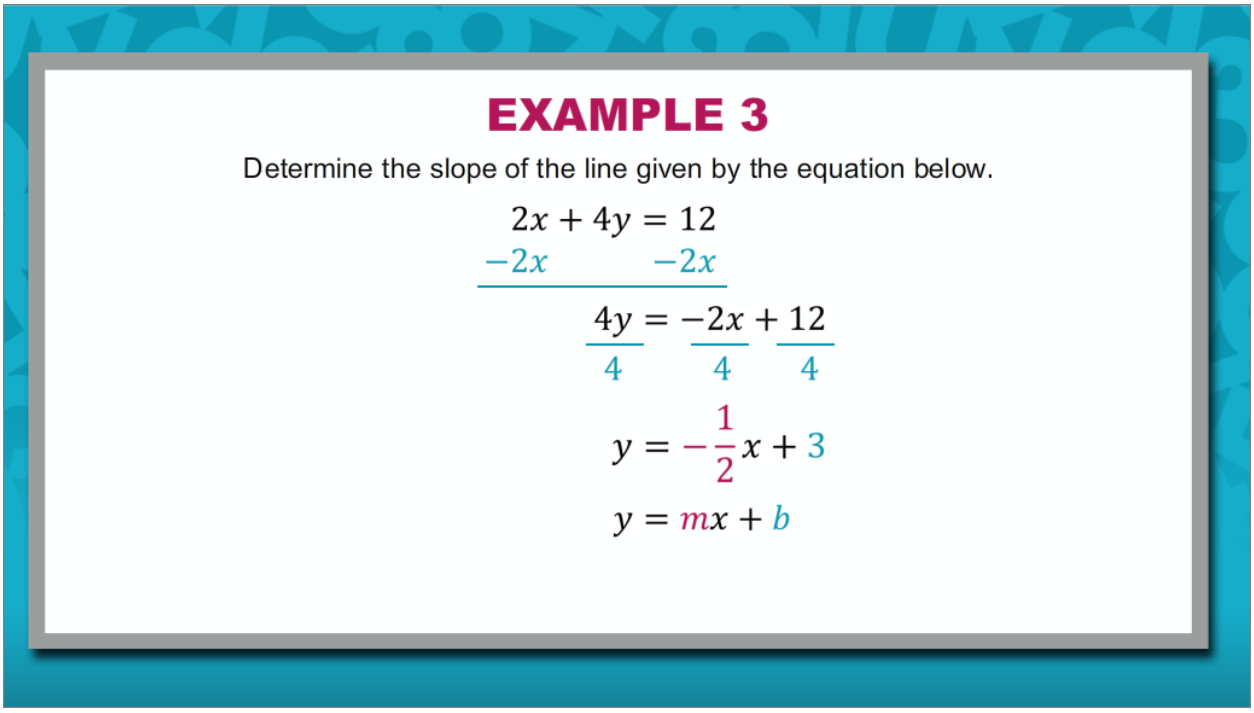
$$2x + 4y = 12$$

In this equation, begin by subtracting $2x$ from each side. The result is $4y = -2x + 12$. Next, divide each term by 4.

You find that $y = -\frac{1}{2}x + 3$.

$$2x + 4y = 12$$
$$-2x \quad -2x$$
$$\frac{4y}{4} = \frac{-2x}{4} + \frac{12}{4}$$
$$y = -\frac{1}{2}x + 3$$

Example Three (continued)




Determine the slope of the line given by the equation below.

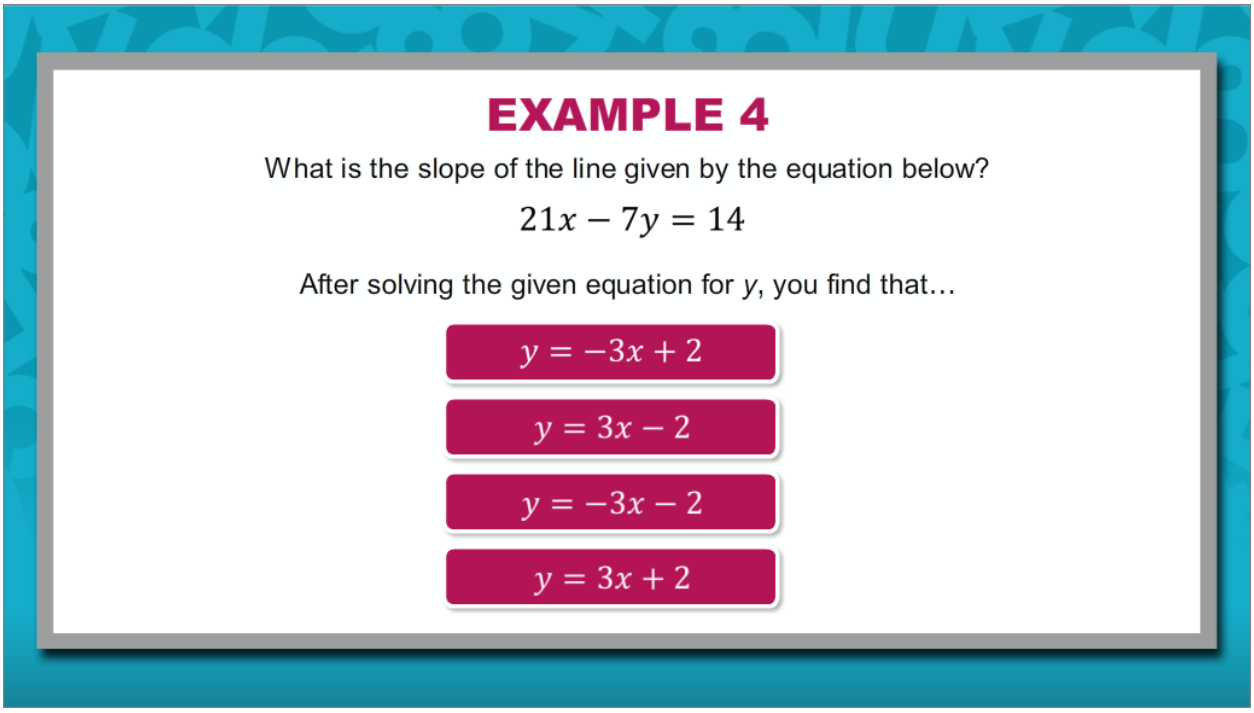
$$2x + 4y = 12$$

Now that you have represented the equation in slope-intercept form you can identify the slope.

Recall that in slope-intercept form, $m$ represents the slope and $b$ represents the $y$-intercept. Therefore, for this equation the slope is $-\frac{1}{2}$.

$$2x + 4y = 12$$
$$-2x \quad -2x$$
$$\frac{4y}{4} = \frac{-2x}{4} + \frac{12}{4}$$
$$y = -\frac{1}{2}x + 3$$
$$y = -\frac{1}{2}x + 3$$
$$y = mx + b$$

## Example Four




What is the slope of the line given by the equation below?

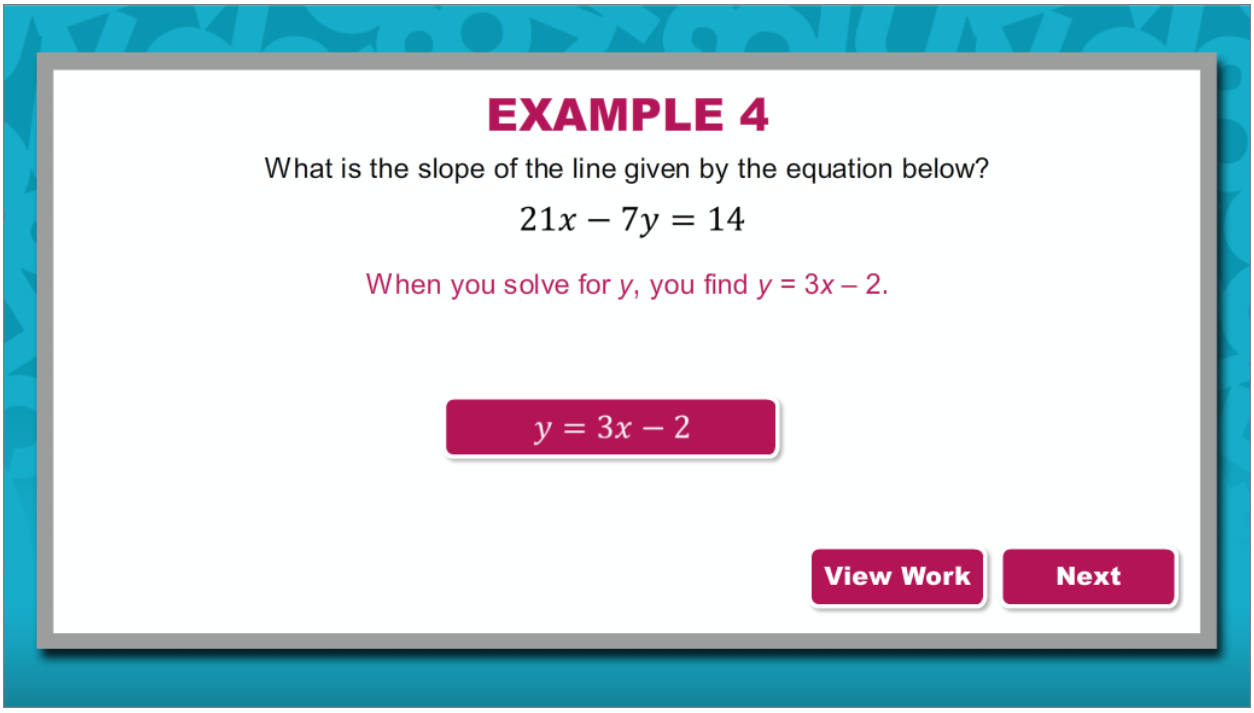
$$21x - 7y = 14$$

Remember, you can determine the slope of a line when given its equation in standard form by representing the equation in slope-intercept form. To do this, solve the given equation for $y$.

After solving the given equation for $y$, you find that…

A) $y = -3x + 2$
B) $y = 3x - 2$
C) $y = -3x - 2$
D) $y = 3x + 2$

Example Four (continued)

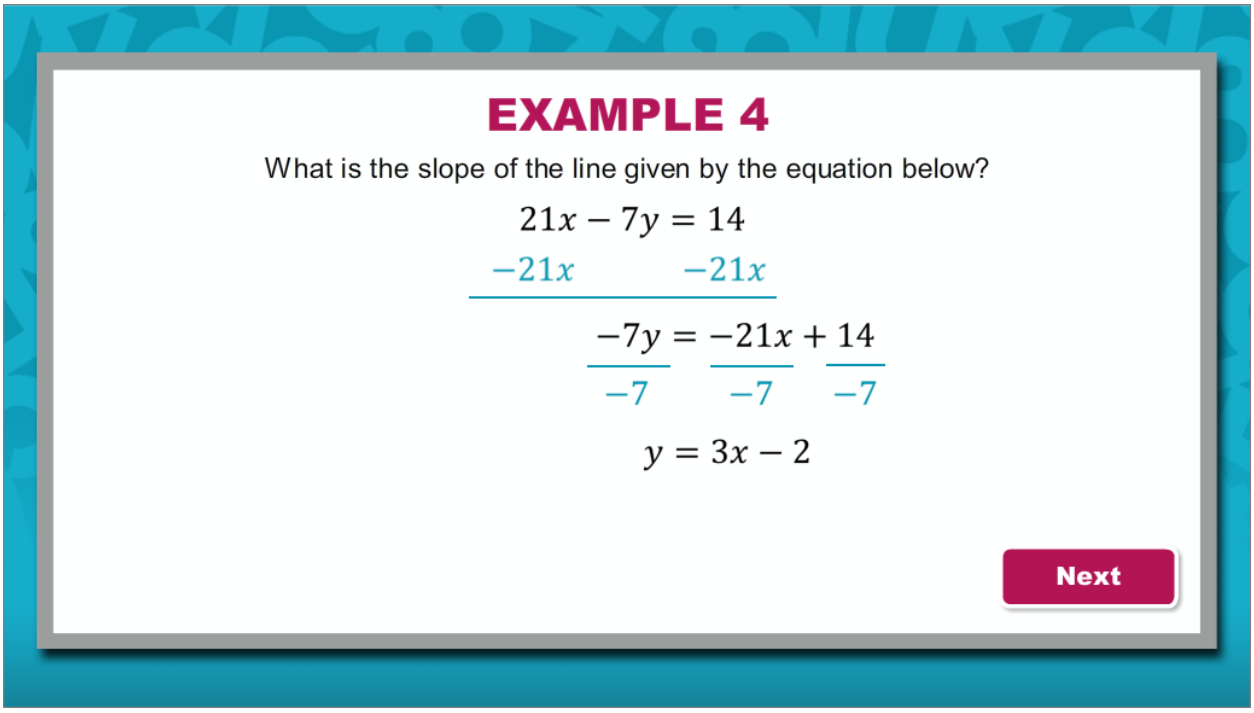



What is the slope of the line given by the equation below?

$$21x - 7y = 14$$

When you solve for $y$, you find that $y = 3x - 2$.

Example Four (continued)

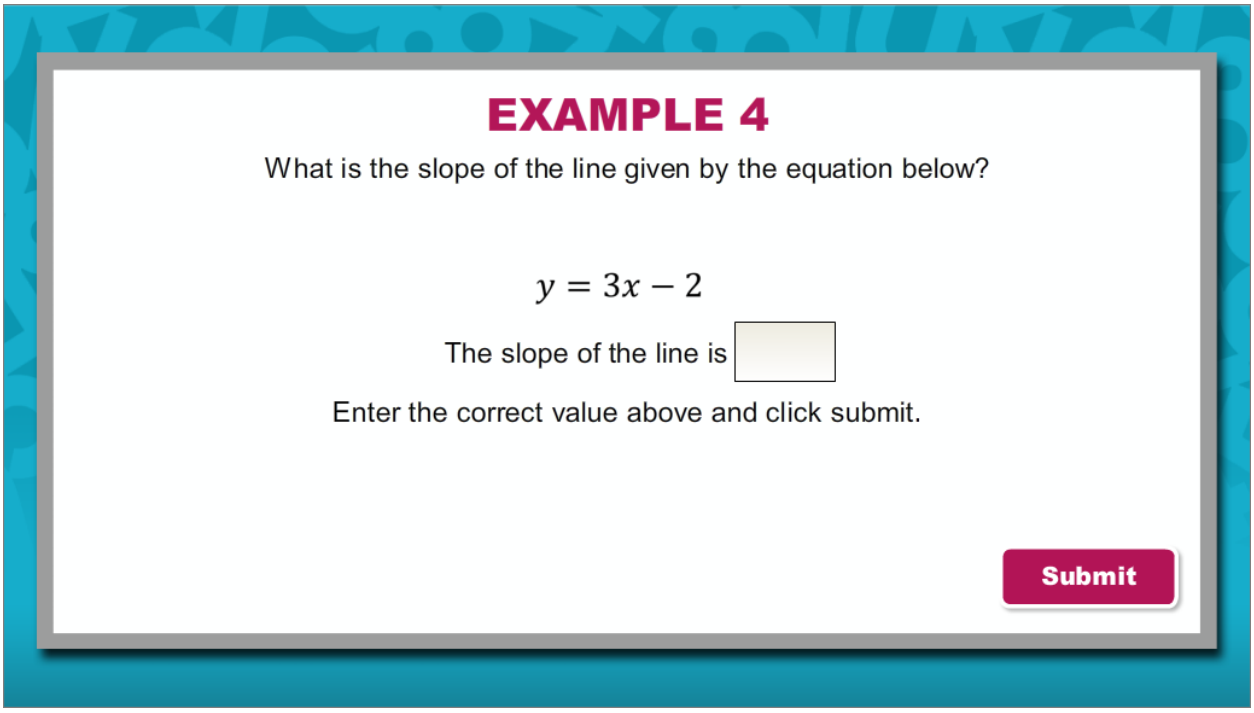



What is the slope of the line given by the equation below?

$$21x - 7y = 14$$

$$21x - 7y = 14$$
$$-21x \quad -21x$$
$$\frac{-7y}{-7} = \frac{-21x}{-7} + \frac{14}{-7}$$
$$y = 3x - 2$$

Example Four (continued)



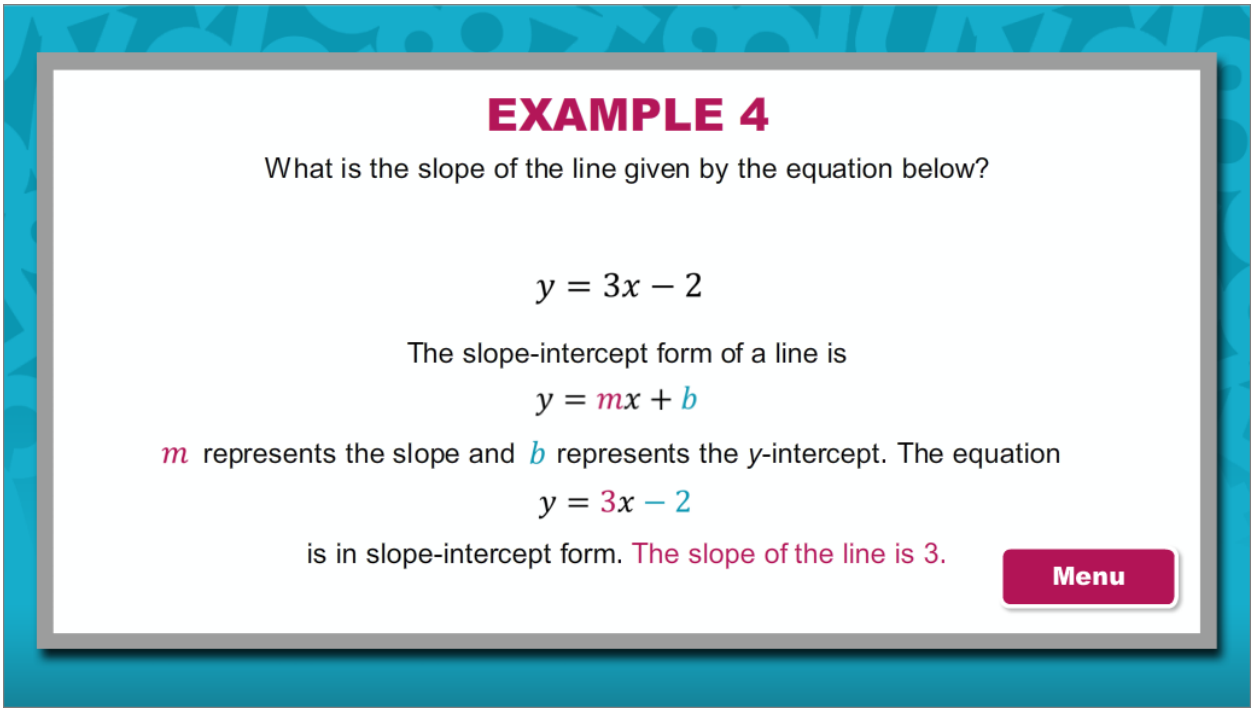

What is the slope of the line given by the equation below?

$$y = 3x - 2$$

The slope of the line is ?

Enter the correct value above and click submit.

Example Four (continued)




What is the slope of the line given by the equation below?

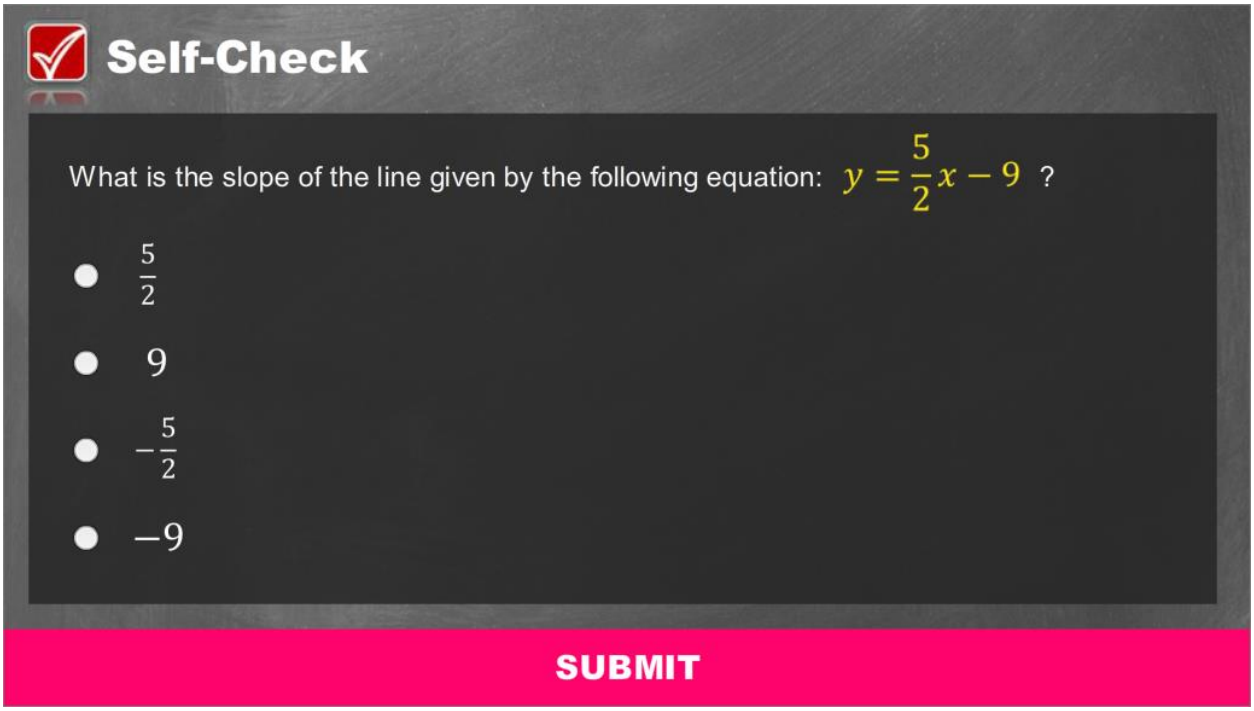
$$y = 3x - 2$$

The slope-intercept form of a line: $y = mx + b$

$m$ represents the slope $b$ represents the $y$-intercept

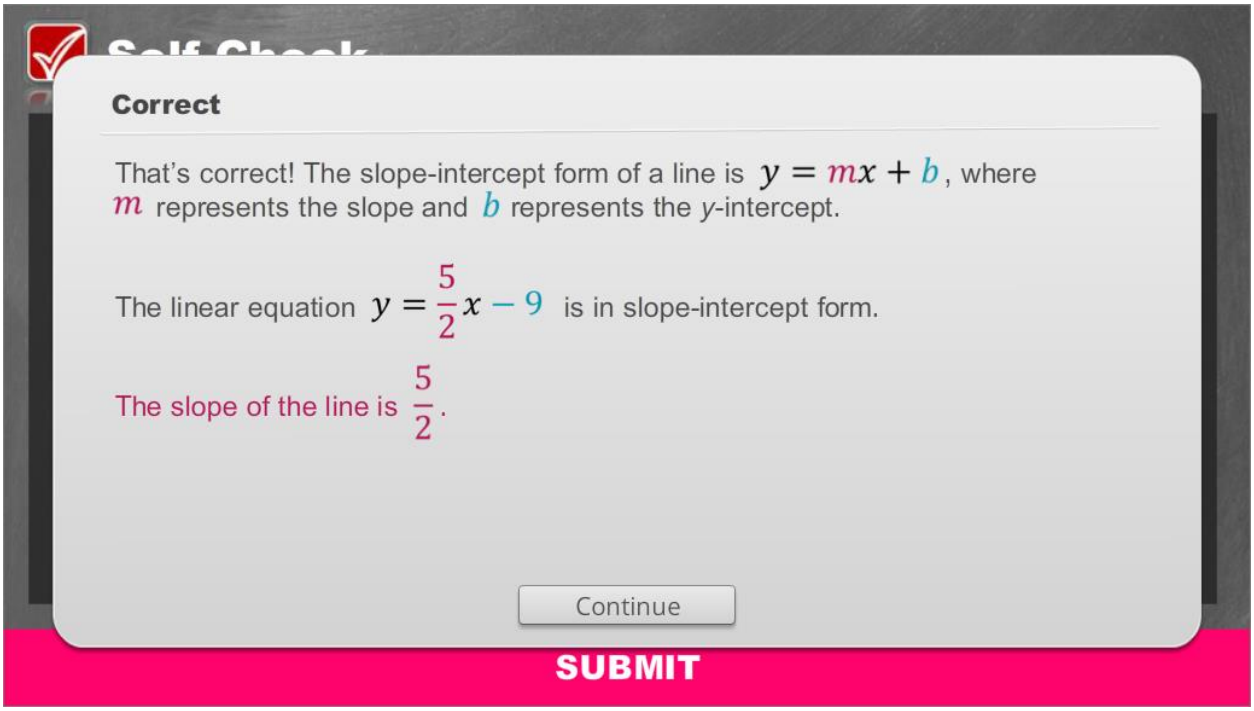
The linear equation $y = 3x - 2$ is in slope-intercept form. The slope of the line is $3$.

Self-Check 1



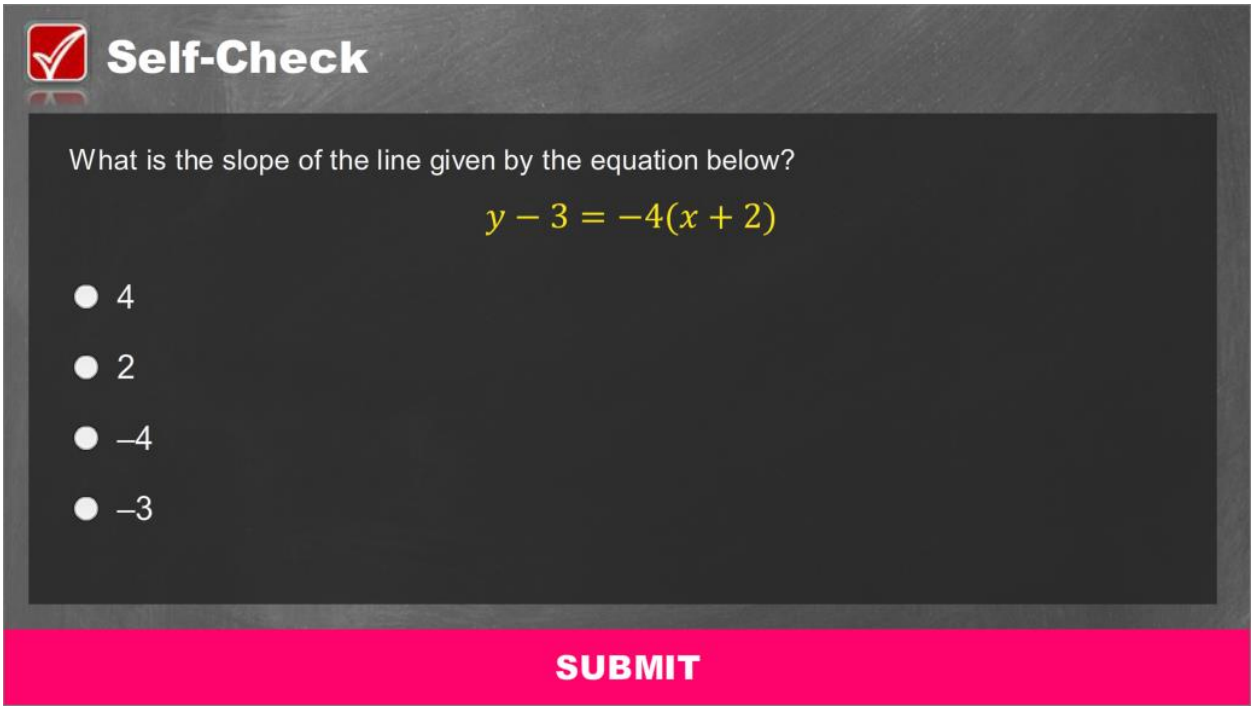

Solve the problem in the image above to check your understanding of the content.

## Self-Check 1: Answer



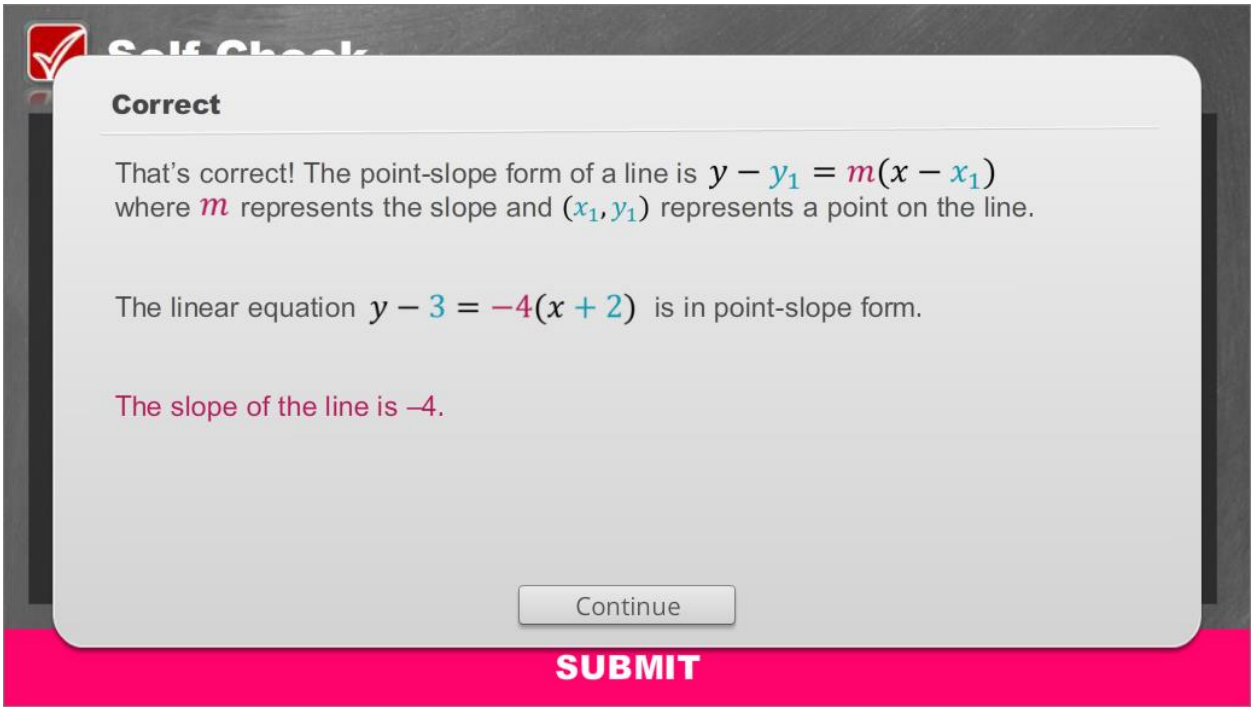

For your reference, the image above shows the correct solution to the self-check problem.

Self-Check 2



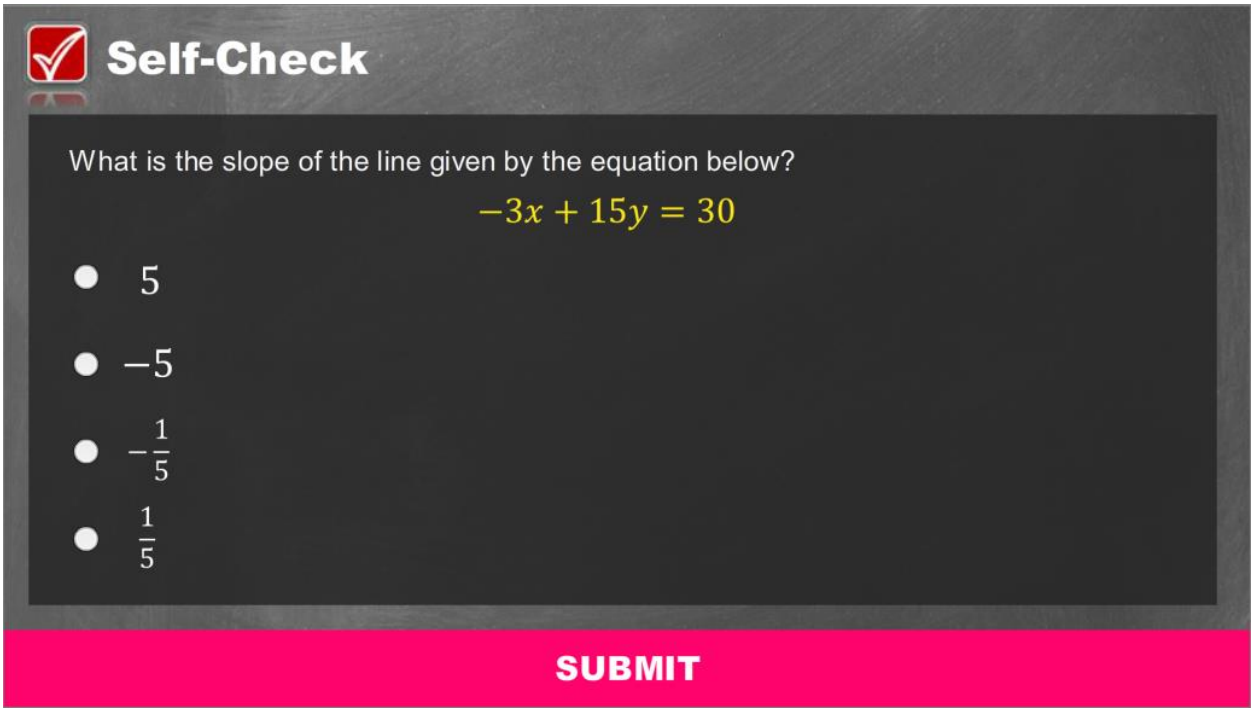

Solve the problem in the image above to check your understanding of the content.

## Self-Check 2: Answer



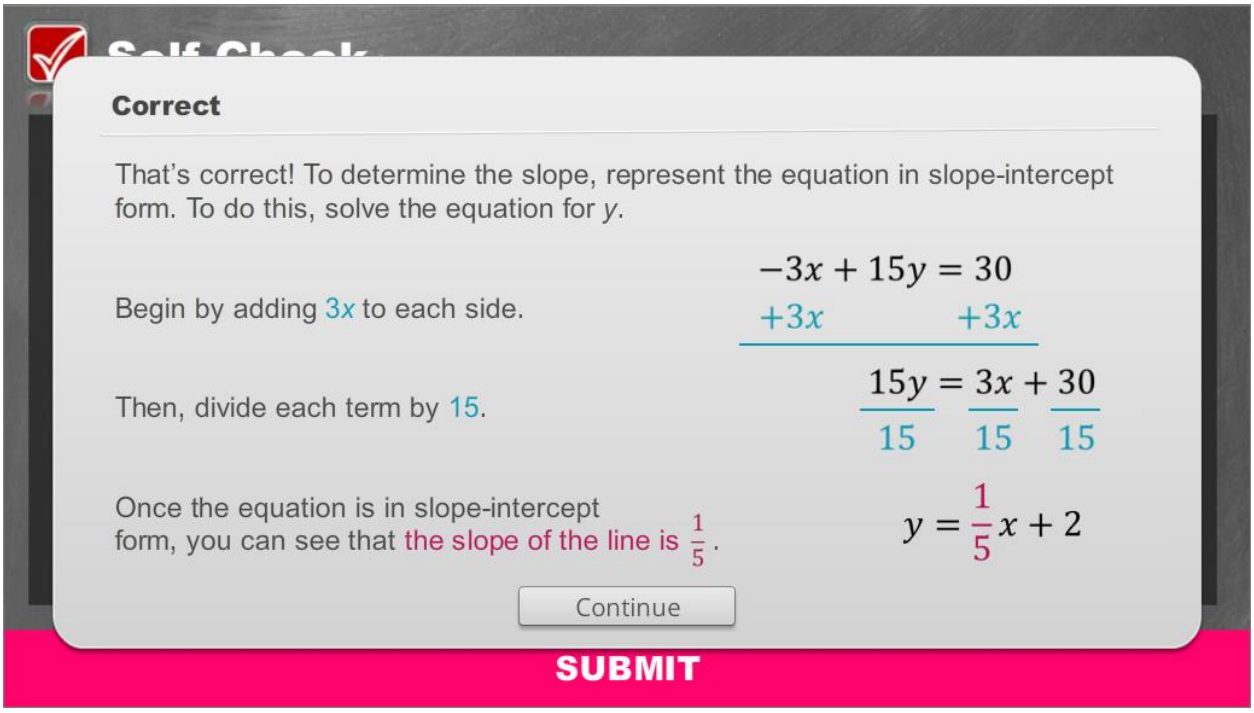

For your reference, the image above shows the correct solution to the self-check problem.

Self-Check 3



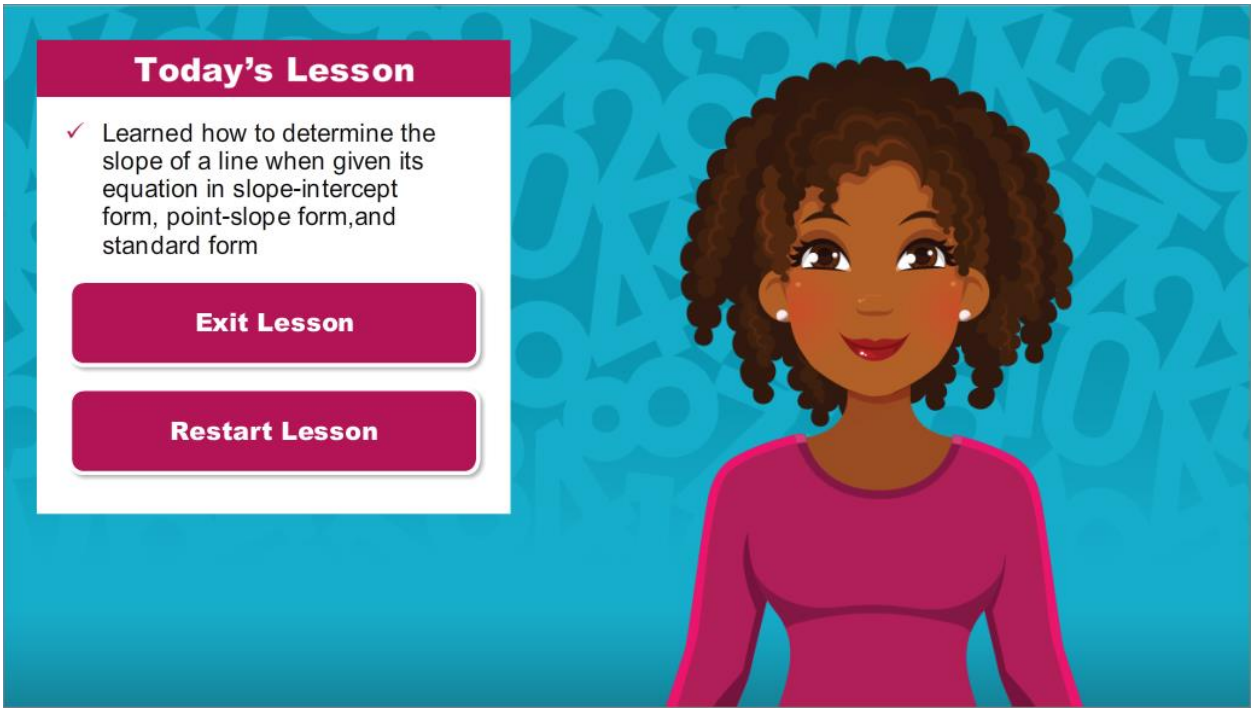

Solve the problem in the image above to check your understanding of the content.

## Self-Check 3: 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 will learned how to determine the slope of a line when given its equation in slope-intercept form, point-slope form, and standard form.