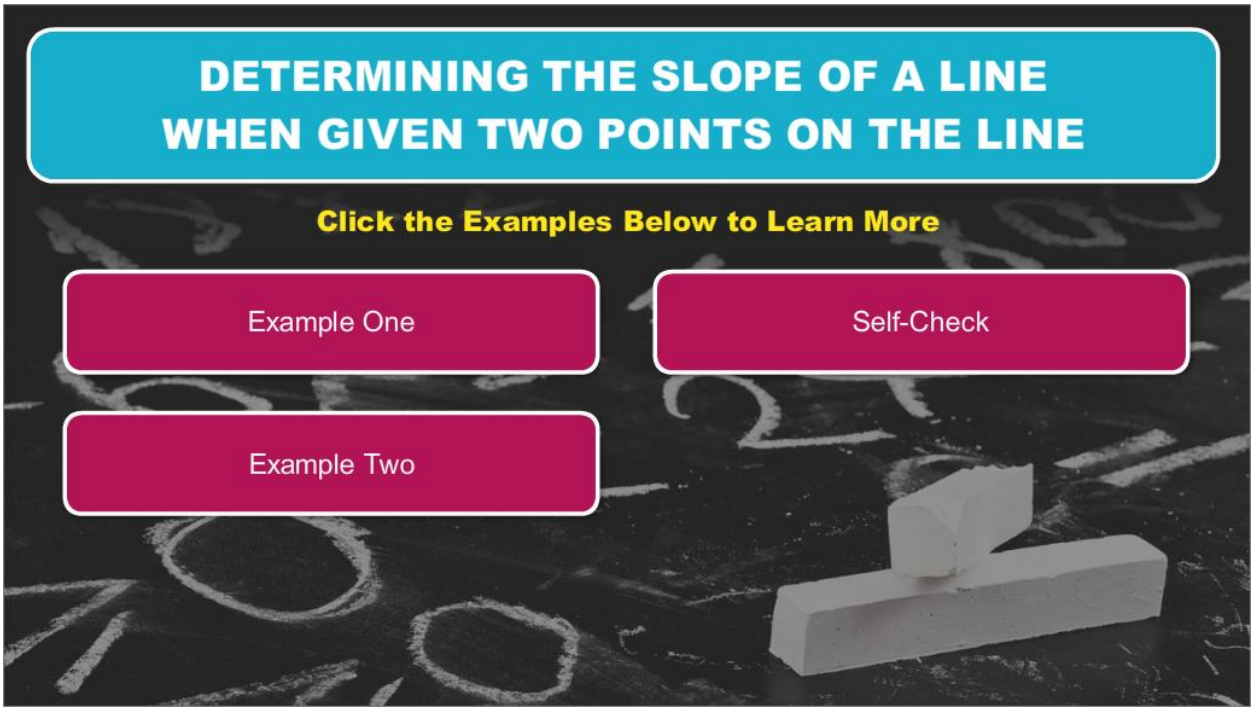
Module 9: Writing Linear Equations

Topic 1 Content: Determining the Slope of a Line When Given Two Points on the Line

Introduction

Hi there! I'm so glad to have you here for this lesson in Algebra I, where you will learn how to use the slope formula to determine the slope of a line when given the coordinates of two points on the line.

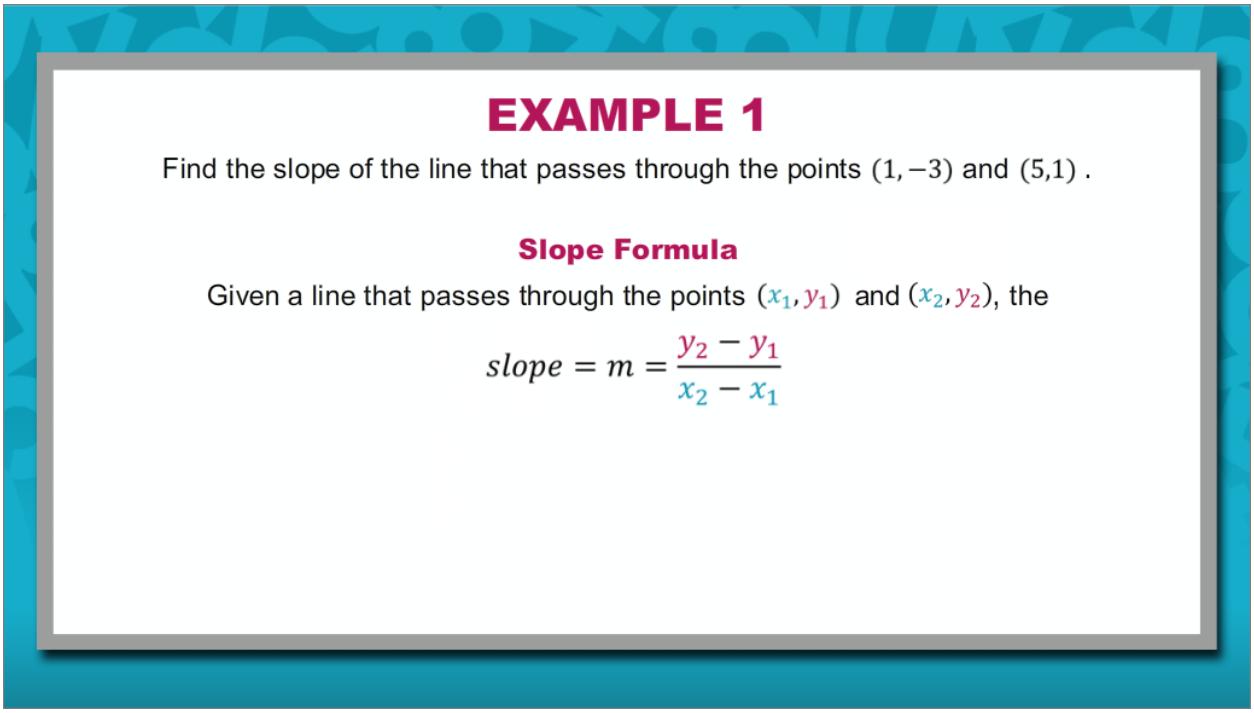
Determining the Slope of a Line When Given Two Points on the Line



Click the examples below to learn more.

- Example One
- Example Two
- Self-Check

Example One

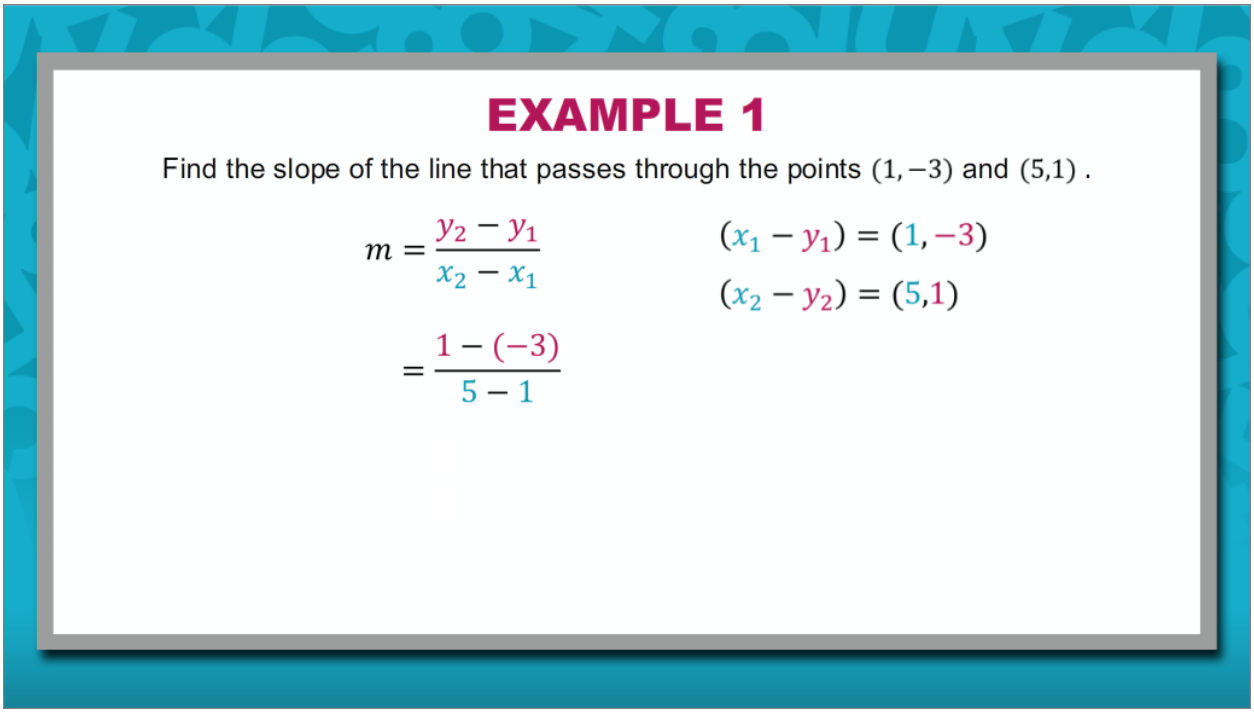


Find the slope of the line that passes through the points $(1, -3)$ and $(5, 1)$.

Given a line that passes through the points (x_1, y_1) and (x_2, y_2), the $slope = m = \frac{y_2 - y_1}{x_2 - x_1}$.

$$Slope = m = \frac{y_2 - y_1}{x_2 - x_1}$$

Example One (continued)



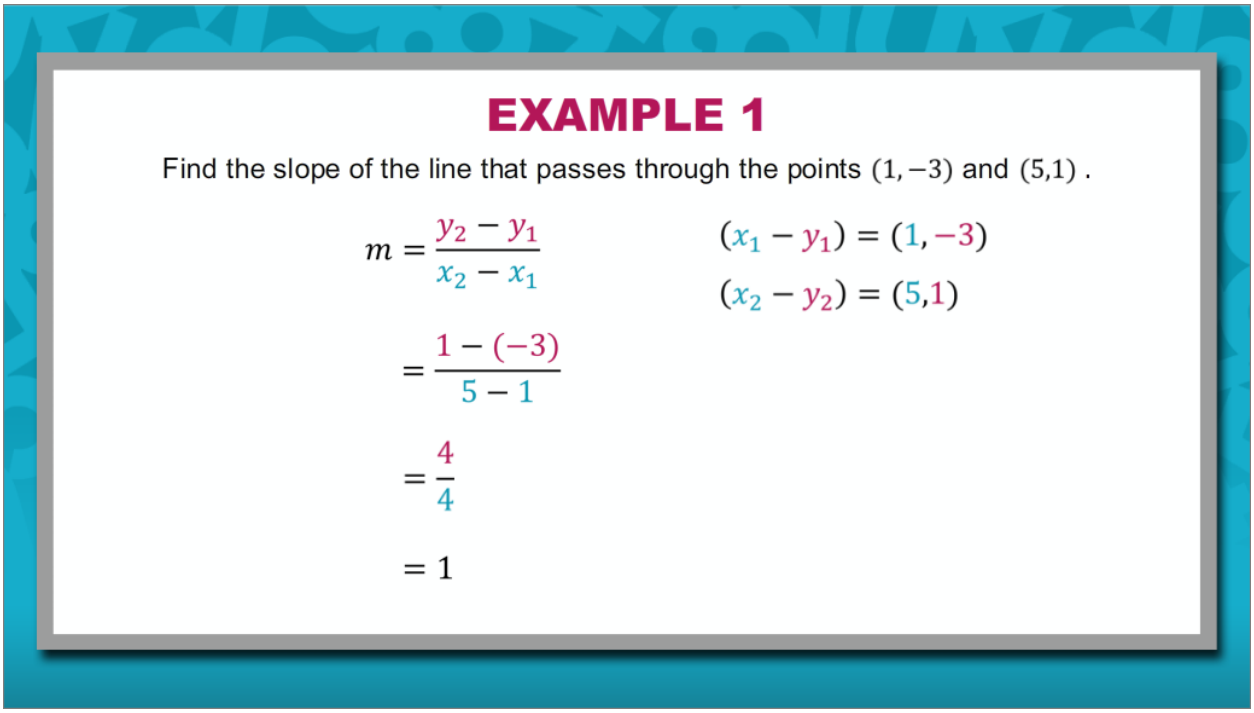
Find the slope of the line that passes through the points $(1, -3)$ and $(5, 1)$.

For this example, let $(x_1, y_1) = (1, -3)$ and $(x_2, y_2) = (5, 1)$. Then, substitute the appropriate values in the slope formula: y_2 is 1, y_1 is -3, x_2 is 5, and x_1 is 1.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{1 - (-3)}{5 - 1}$$

$$(x_1 - y_1) = (1, -3)$$
$$(x_2 - y_2) = (5, 1)$$

Example One (continued)



Find the slope of the line that passes through the points $(1, -3)$ and $(5, 1)$.

Now begin to simplify the expression.

$1 - (-3) = 4$

$5 - 1 = 4$

$\frac{4}{4} = 1$

Therefore, the slope of the line that passes through the points $(1, -3)$ and $(5, 1)$ is 1.

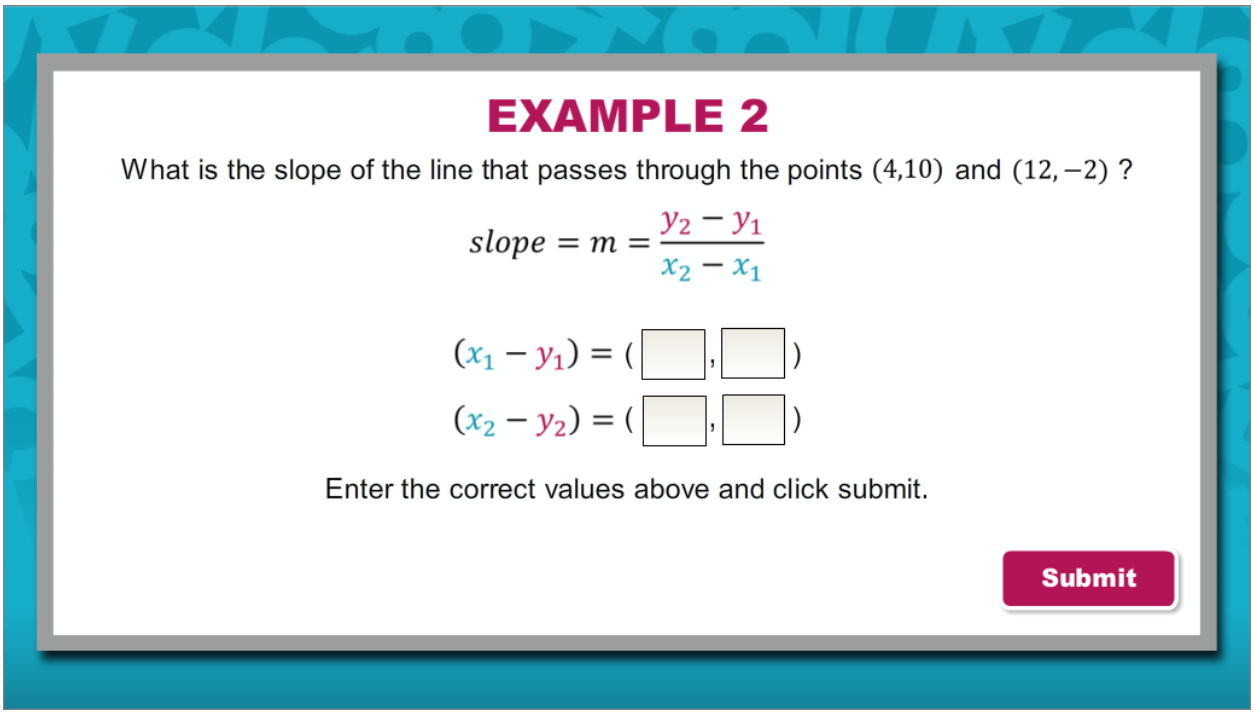
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{1 - (-3)}{5 - 1}$$
$$= \frac{4}{4}$$

$(x_1 - y_1) = (1, -3)$

$(x_2 - y_2) = (5, 1)$

$= 1$

Example Two



What is the slope of the line that passes through the points $(4, 10)$ and $(12, -2)$?

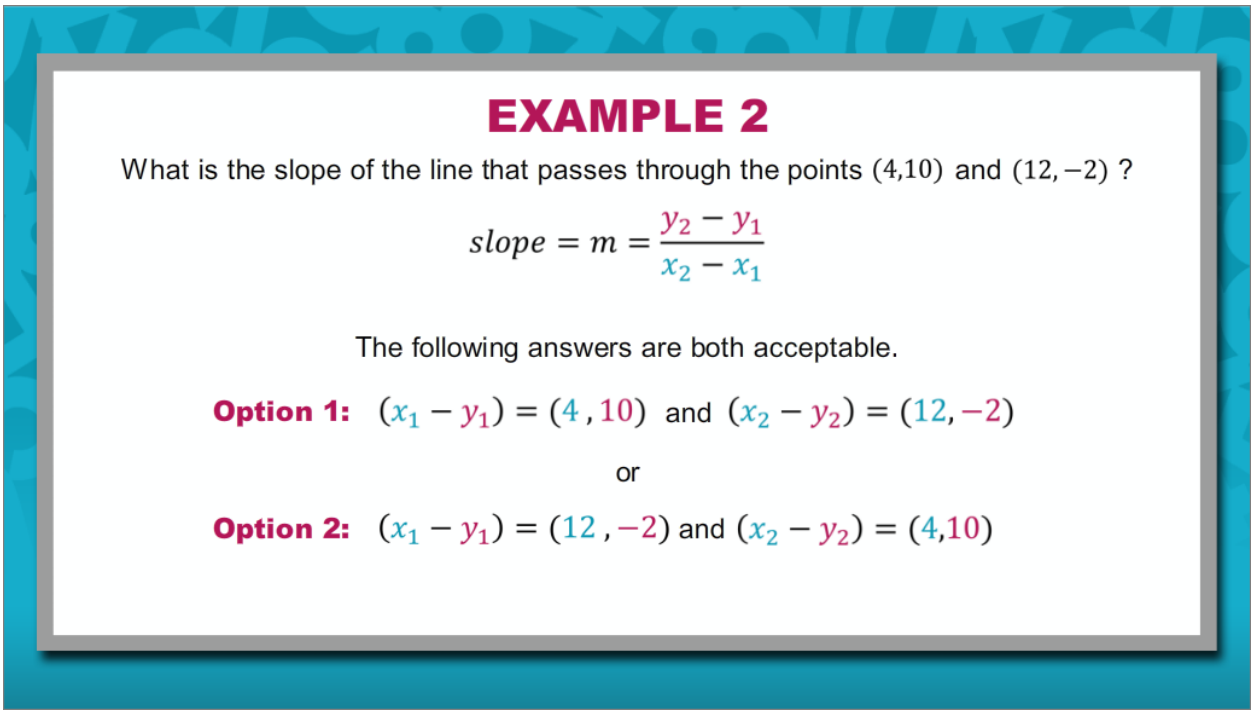
$$slope = m = \frac{y_2 - y_1}{x_2 - x_1}$$

Recall that the slope formula can be used to find the slope of a line that passes through two given points.

$$(x_1 - y_1) = (?, ?)$$
$$(x_2 - y_2) = (?, ?)$$

Enter the correct values above and click submit.

Example Two (continued)



What is the slope of the line that passes through the points $(4, 10)$ and $(12, -2)$?

$$slope = m = \frac{y_2 - y_1}{x_2 - x_1}$$

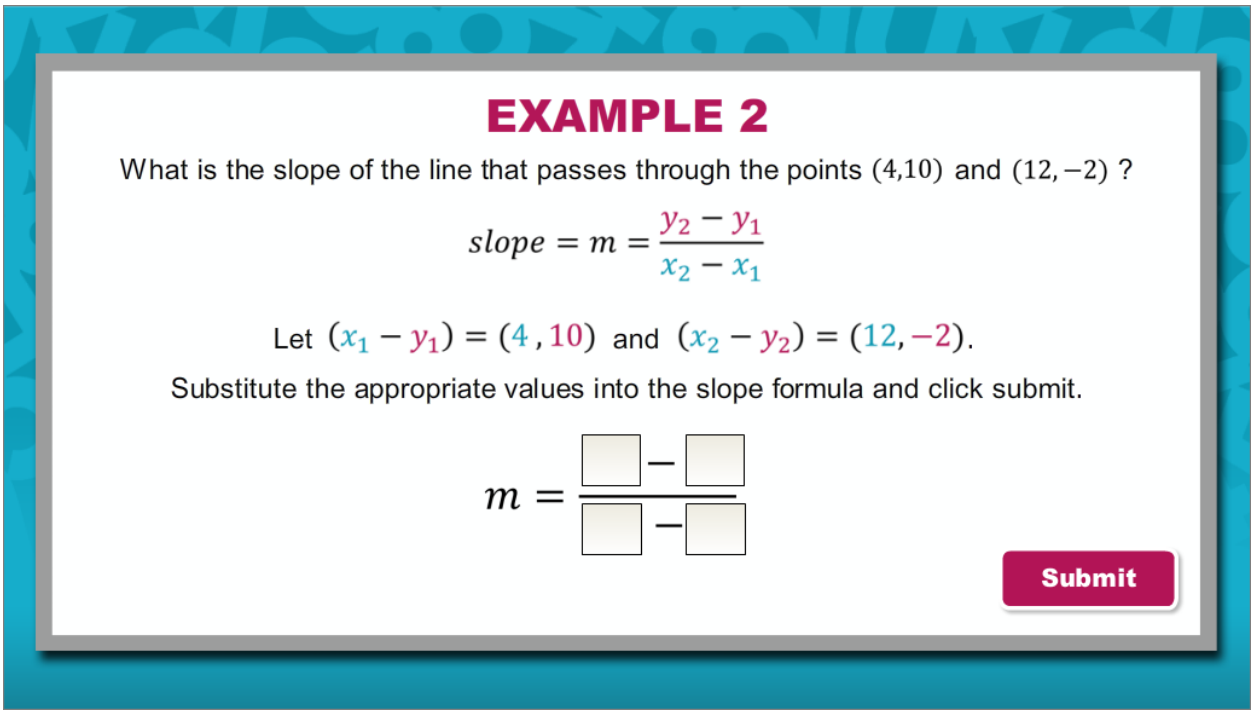
The following answers are both acceptable.

Option 1: $(x_1 - y_1) = (4, 10)$ and $(x_2 - y_2) = (12, -2)$

or

Option 2: $(x_1 - y_1) = (12, -2)$ and $(x_2 - y_2) = (4, 10)$

Example Two (continued)



What is the slope of the line that passes through the points $(4, 10)$ and $(12, -2)$?

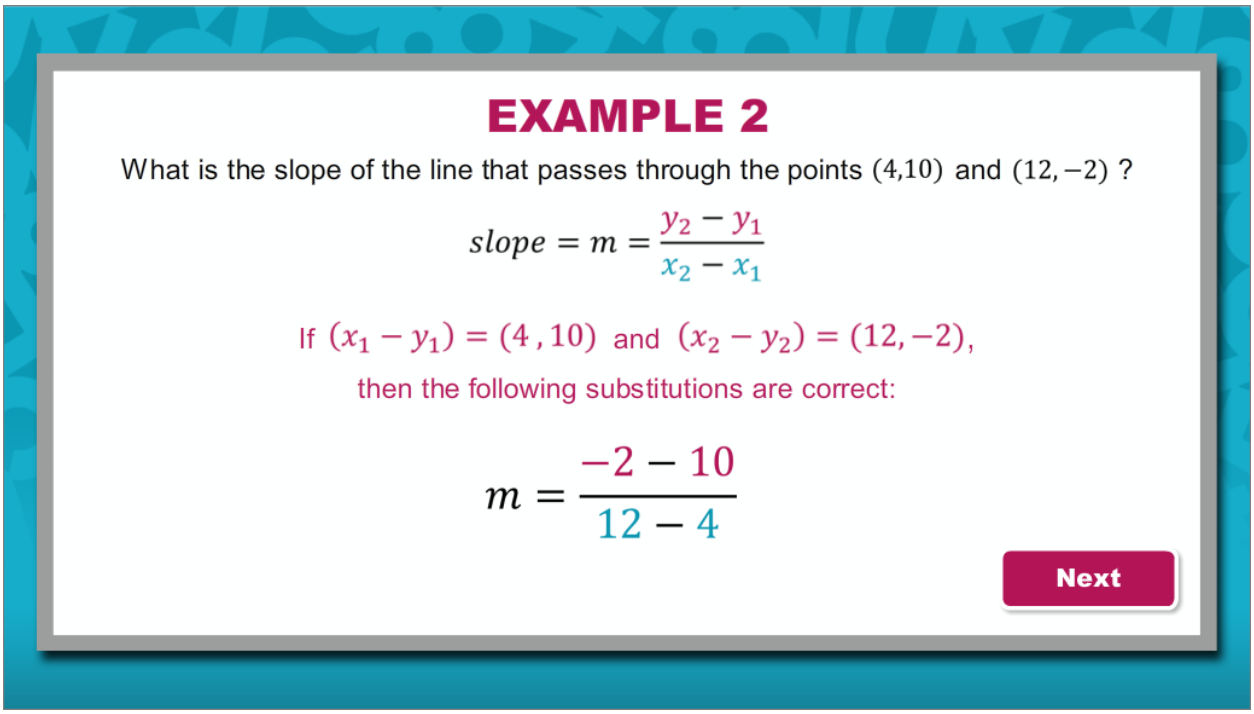
$$slope = m = \frac{y_2 - y_1}{x_2 - x_1}$$

Let $(x_1 - y_1) = (4, 10)$ and $(x_2 - y_2) = (12, -2)$.

Substitute the appropriate values in the slope formula and click submit.

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

Example Two (continued)



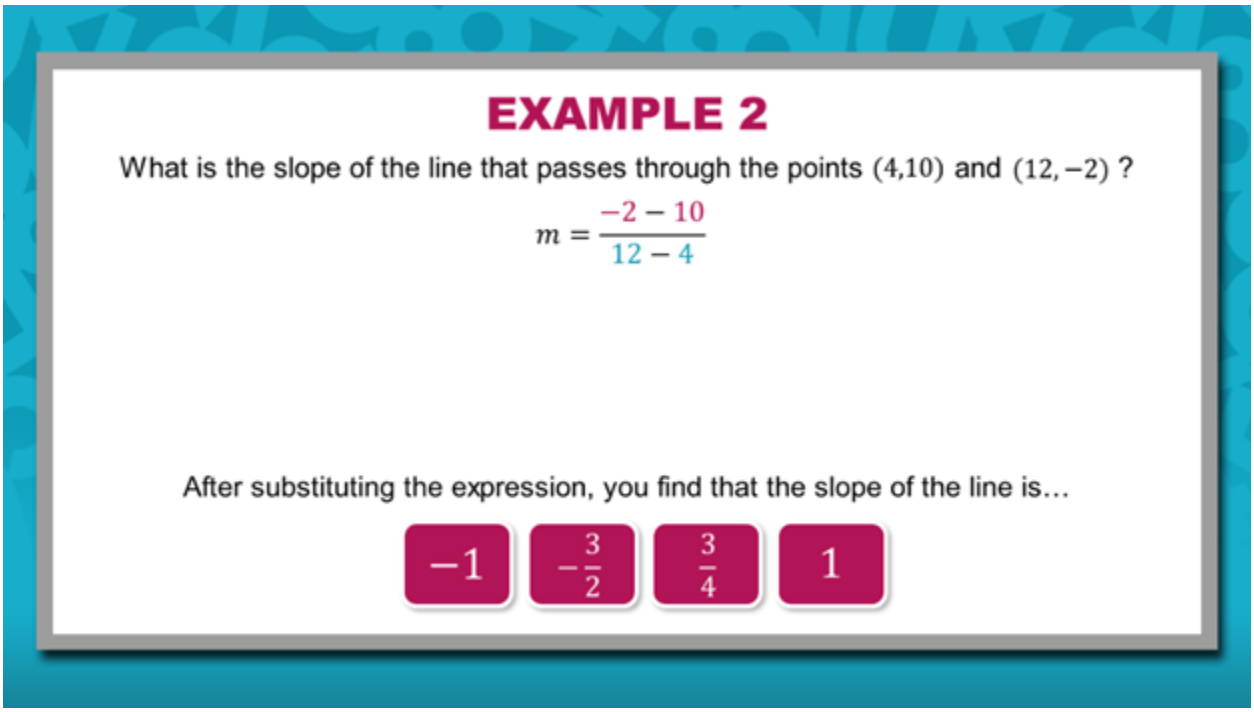
What is the slope of the line that passes through the points $(4, 10)$ and $(12, -2)$?

$$slope = m = \frac{y_2 - y_1}{x_2 - x_1}$$

If $(x_1 - y_1) = (4, 10)$ and $(x_2 - y_2) = (12, -2)$, then the following substitutions are correct:

$$m = \frac{-2 - 10}{12 - 4}$$

Example Two (continued)



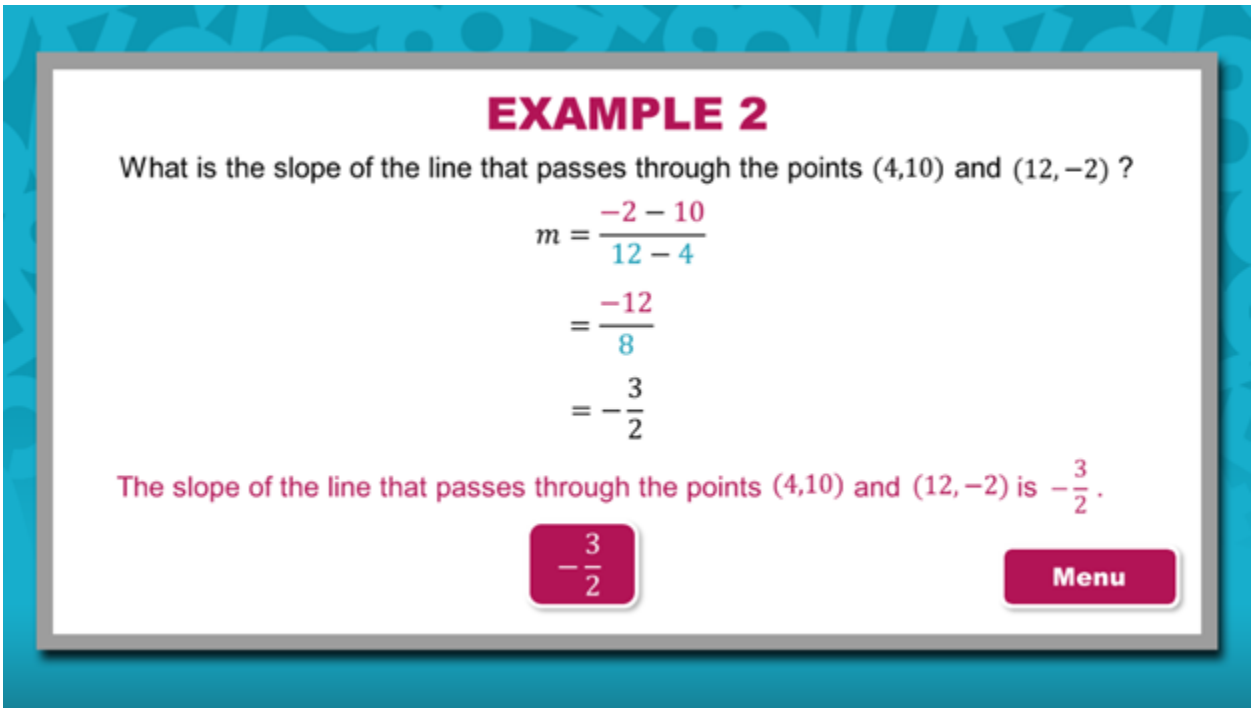
What is the slope of the line that passes through the points $(4, 10)$ and $(12, -2)$?

$$m = \frac{-2-10}{12-4}$$

After substituting the expression, you find that the slope of the line is…

A) -1
B) $-\frac{3}{2}$
C) $\frac{3}{4}$
D) 1

Example Two (continued)

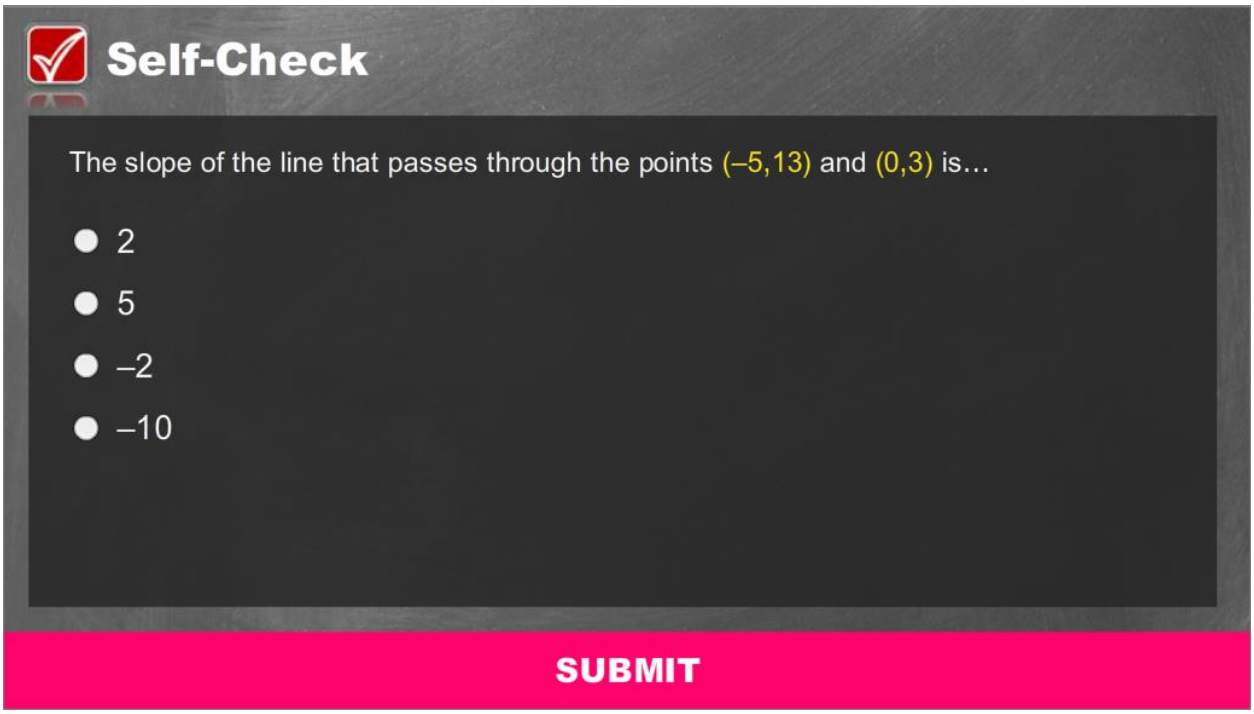


What is the slope of the line that passes through the points $(4, 10)$ and $(12, -2)$?

$$m = \frac{-2-10}{12-4}$$
$$= \frac{-12}{8}$$
$$= -\frac{3}{2}$$

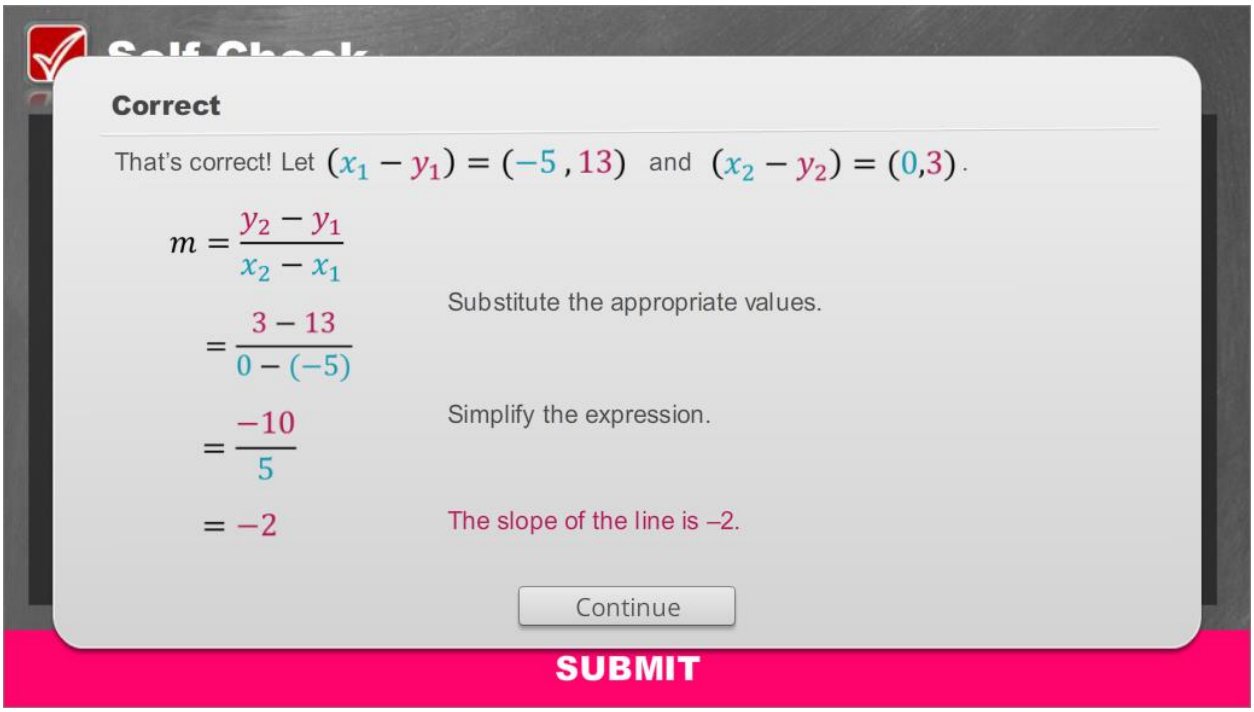
The slope of the line that passes through the points $(4, 10)$ and $(12, -2)$ is $-\frac{3}{2}$.

Self-Check



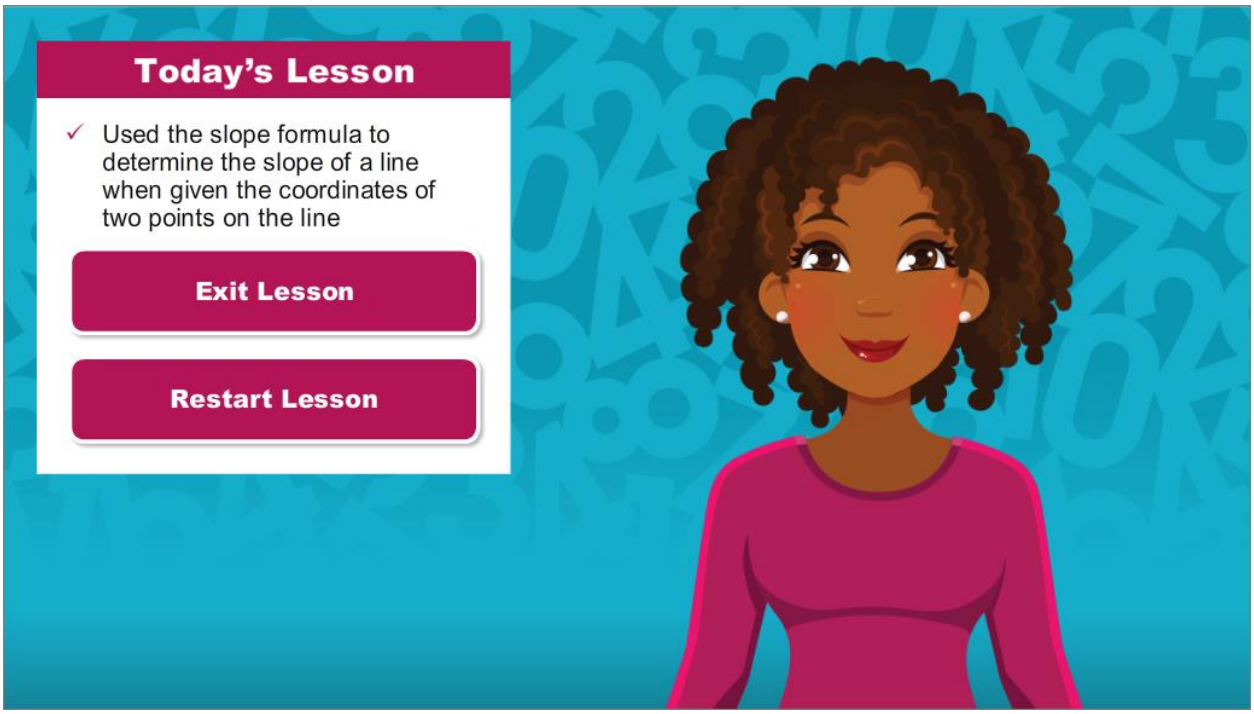
Solve the problem in the image above to check your understanding of the content.

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 use the slope formula to determine the slope of a line when given the coordinates of two points on the line.