

## Module 9: Writing Linear Equations

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

#### Introduction



**Today's Lesson**

- You will learn how to determine the slope of a line when given the graph of the line.

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

## Module 9: Writing Linear Equations

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

Determine the Slope of a Line When Given The Graph of The Line

The graphic features a dark background with faint chalkboard-style drawings of lines and circles. At the top, a teal rounded rectangle contains the title "DETERMINING THE SLOPE OF A LINE WHEN GIVEN THE GRAPH OF THE LINE" in white, bold, uppercase letters. Below this, a yellow text prompt reads "Click the Examples Below to Learn More". Three magenta rounded rectangles are arranged in a 2x2 grid: "Example One" (top-left), "Self-Check" (top-right), and "Example Two" (bottom-left). In the bottom right corner, there is a 3D rendering of a white rectangular block with a smaller white rectangular block resting on top of it.

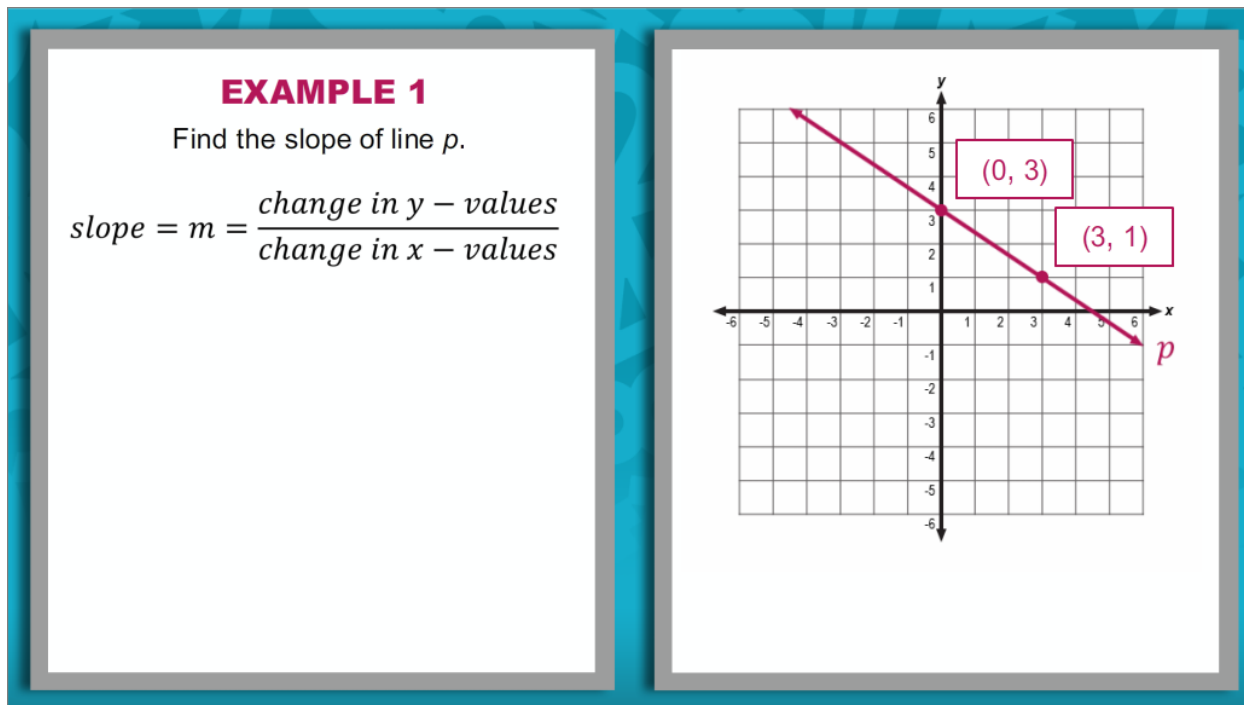
Click the examples below to learn more.

- Example One
- Example Two
- Self-Check

## Module 9: Writing Linear Equations

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

#### Example One



Example 1: Find the slope of line  $p$ .

The slope of a line is represented by the variable  $m$  and is a ratio of the change in  $y$ -values to the change in  $x$ -values.

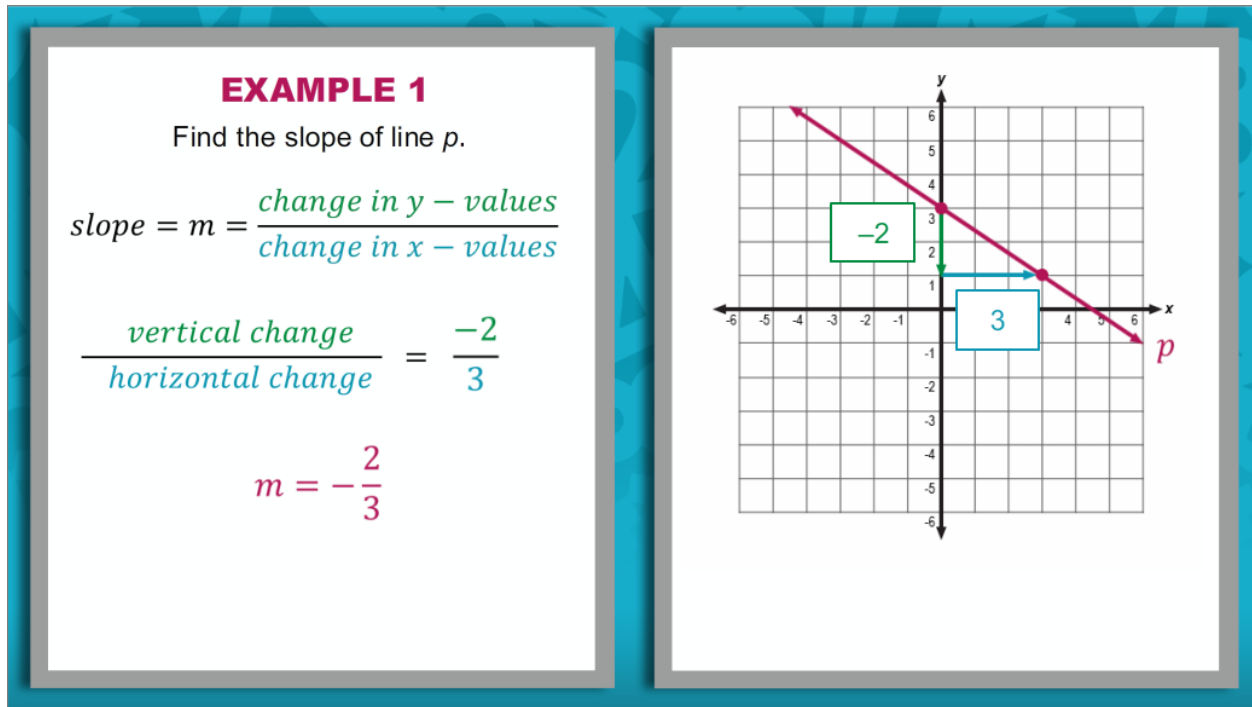
$$\text{slope} = m = \frac{\text{change in } y\text{-values}}{\text{change in } x\text{-values}}$$

To determine the slope of line  $p$ , find two points on the line. Avoid points whose coordinates are fractions or decimal values. Instead, locate two points whose coordinates are integers. For example, you can choose the points  $(0, 3)$  and  $(3, 1)$ .

## Module 9: Writing Linear Equations

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

Example One (continued)



Example 1: Find the slope of line  $p$ .

Begin at the point that is farthest to the left. In this case, it is located at  $(0, 3)$ . To reach the point  $(3, 1)$ , you must move down 2 units and right 3 units.

The change in the  $y$ -values is the vertical change. Because you moved 2 units down, this value is  $-2$ . The change in the  $x$ -values is the horizontal change. Because you moved 3 units right, this value is  $3$ .

You can conclude that the slope of line is  $-\frac{2}{3}$ .

$$\text{slope} = m = \frac{\text{change in } y\text{-values}}{\text{change in } x\text{-values}} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{-2}{3}$$

$$m = -\frac{2}{3}$$

## Module 9: Writing Linear Equations

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

#### Example Two

**EXAMPLE 2**

What is the slope of the line graphed to the right?

Locate and click two points on the line whose coordinates are integers.

Example 2: What is the slope of the line graphed to the right?

To determine the slope of the line, find two points on the line. Remember to avoid points whose coordinates are fractions or decimal values. Instead, locate two points with integral coordinates. Or in other words, find two points whose coordinates are integers.

Locate and click two points on the line whose coordinates are integers.

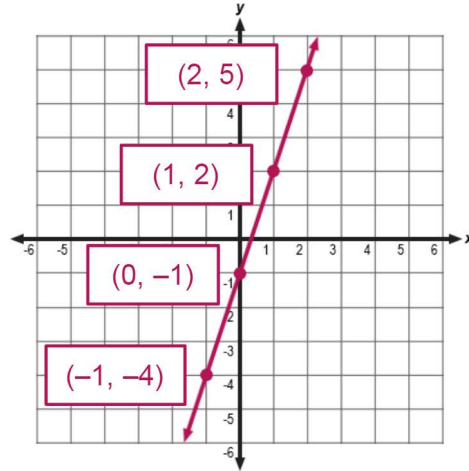
## Module 9: Writing Linear Equations

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

#### Example Two (continued)

#### EXAMPLE 2

What is the slope of the line graphed to the right?



You may have chosen any two of the points indicated above.

**Next**

Example 2: What is the slope of the line graphed to the right?

You may have chosen any two of the points indicated above.

## Module 9: Writing Linear Equations

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

#### Example Two (continued)

**EXAMPLE 2**

What is the slope of the line graphed to the right?

$$\text{slope} = m = \frac{\text{change in } y\text{-values}}{\text{change in } x\text{-values}}$$
  
$$\frac{\text{vertical change}}{\text{horizontal change}} =$$

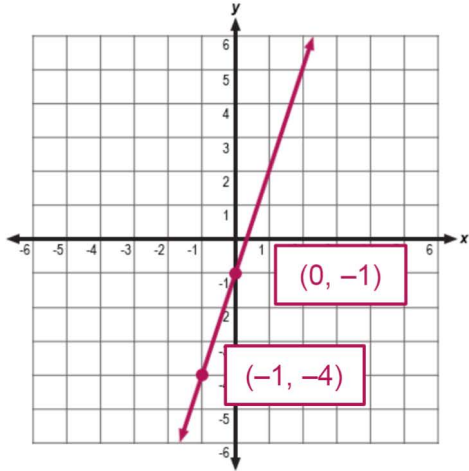
What is the slope of the line?

3

$\frac{1}{3}$

-3

$-\frac{1}{3}$



Example 2: What is the slope of the line graphed to the right?

To calculate the slope of a line you can use any two points on the line. For this example, use  $(-1, -4)$  and  $(0, -1)$ .

To calculate the slope, find the ratio of the change in  $y$ -values to the change in  $x$ -values. Or in other words, find the ratio of the vertical change to the horizontal change.

$$\text{slope} = m = \frac{\text{change in } y\text{-values}}{\text{change in } x\text{-values}} = \frac{\text{vertical change}}{\text{horizontal change}} =$$

What is the slope of the line?

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

## Module 9: Writing Linear Equations

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

#### Example Two (continued)

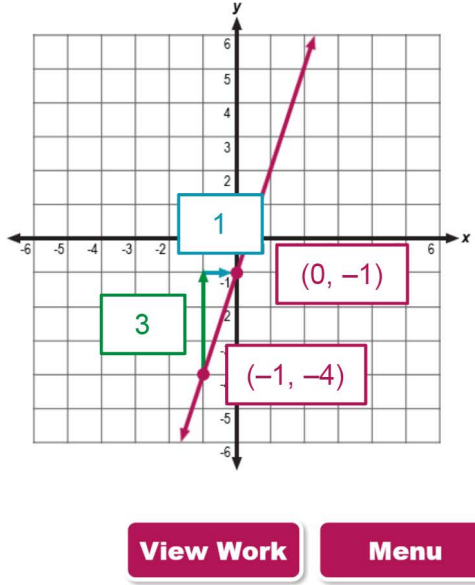
**EXAMPLE 2**

What is the slope of the line graphed to the right?

$$\text{slope} = m = \frac{\text{change in } y\text{-values}}{\text{change in } x\text{-values}}$$
$$\frac{\text{vertical change}}{\text{horizontal change}} = \frac{3}{1} = 3$$

The slope of the line is 3.

3



Example 2: What is the slope of the line graphed to the right?

$$\text{slope} = m = \frac{\text{change in } y\text{-values}}{\text{change in } x\text{-values}} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{3}{1} = 3$$

The slope of the line is 3.



## Module 9: Writing Linear Equations

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

#### Example Two (continued)

Begin at the point that is farthest to the left,  $(-1, -4)$ .

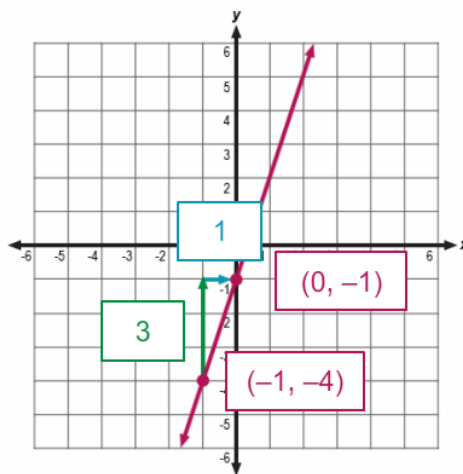
To reach the point  $(0, -1)$  you must move **3 units up** and **1 unit right**.

The **change in the y-values** is the **vertical change**. Because you move **3 units up**, this value is **3**.

The **change in the x-values** is the **horizontal change**. Because you move **1 unit right**, this value is **1**.

You can conclude that the slope of the line is:

$$m = \frac{3}{1} = 3$$



Begin at the point that is farthest to the left,  $(-1, -4)$ .

To reach the point  $(0, -1)$ , you must move **3 units up** and **1 unit right**.

The **change in the y-values** is the **vertical change**. Because you move **3 units up**, this value is **3**.

The **change in the x-values** is the **horizontal change**. Because you move **1 unit right**, this value is **1**.


You can conclude that the slope of line:

$$m \text{ is } \frac{3}{1} = 3.$$

## Module 9: Writing Linear Equations

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

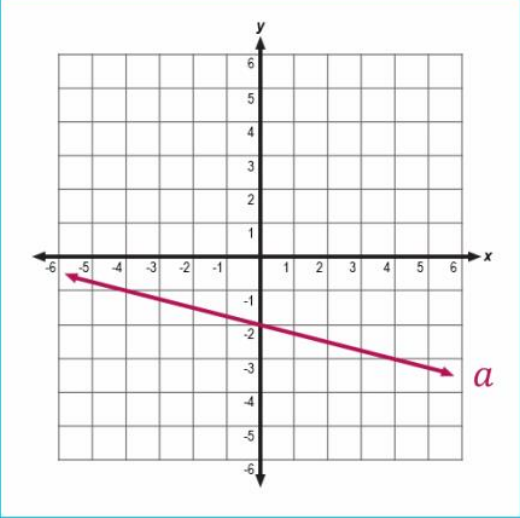
#### Self-Check

**Self-Check**

Find the slope of the line  $a$ .

- 4
- $\frac{1}{4}$
- $-4$
- $-\frac{1}{4}$

### Graph



**SUBMIT**

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

## Module 9: Writing Linear Equations

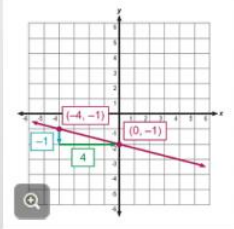
### Topic 1 Content: Determining the Slope of a Line When Given the Graph of the Line

#### Self-Check: Answer

**Self Check** **Graph**

**Correct**

That's correct!


$$\text{slope} = m = \frac{\text{change in } y \text{ - values}}{\text{change in } x \text{ - values}} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{-1}{4}$$

You can conclude that the slope of the line is  $-\frac{1}{4}$ .

Continue

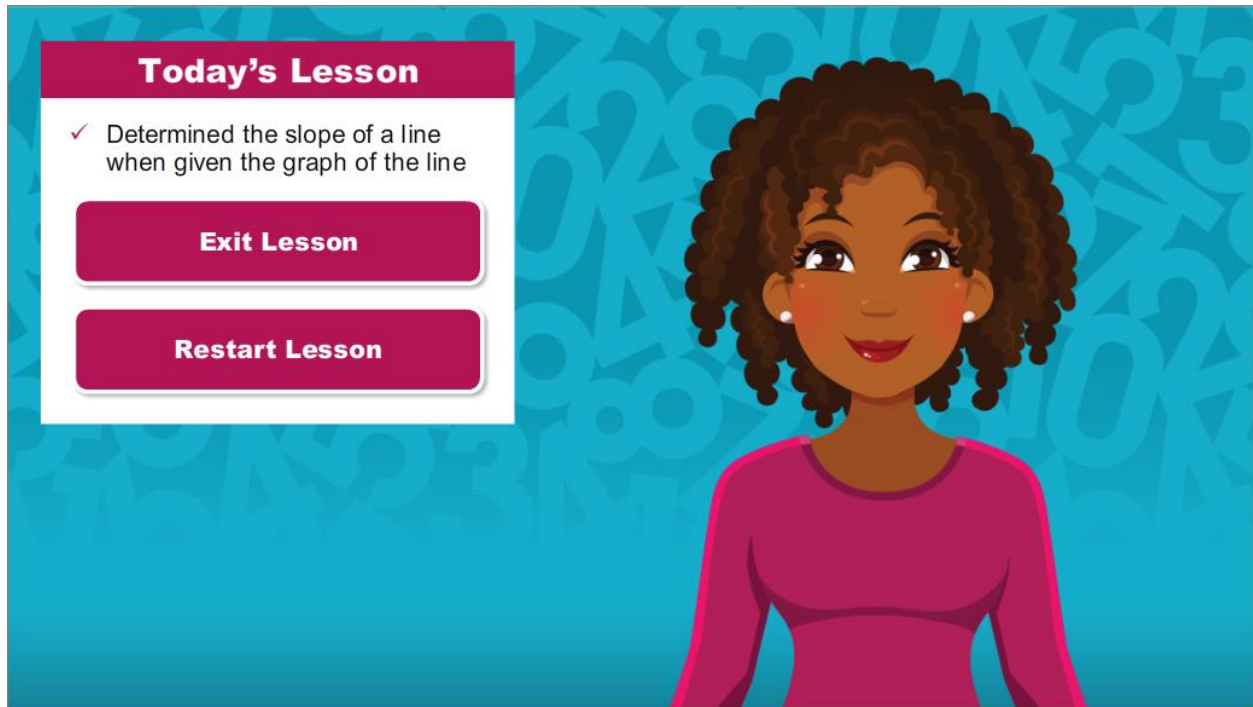
**SUBMIT**

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

## Module 9: Writing Linear Equations

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#### Conclusion



The image shows a digital interface for a lesson conclusion. On the left, a white box with a pink header titled "Today's Lesson" contains a checkmark and the text "Determined the slope of a line when given the graph of the line". Below this are two pink buttons: "Exit Lesson" and "Restart Lesson". On the right, a cartoon illustration of a young woman with dark curly hair and a pink shirt is shown against a blue background with faint mathematical symbols.

You have reached the conclusion of this lesson where you learned how to determine the slope of a line when given the graph of the line.