



## Math Objectives

- Students will recognize that a line with positive slope is rising left to right and that a line with negative slope is falling left to right.
- Students will use the slope ratio, vertical change over horizontal change, to find the slope given the horizontal and vertical lengths.
- Students will solve an application involving slope.

## Vocabulary

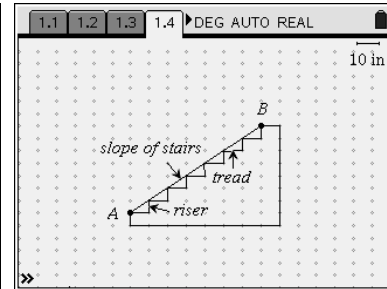
- slope

## About the Lesson

- This lesson is a follow-up lesson to the activity *Understanding Slope ONE*.
- This lesson is designed to help students see how slope is used in real-world applications.
- This lesson involves students recognizing positive and negative slope and using the slope ratio to find the slope of a line segment.

## Related Lessons

- Prior to this lesson: Understanding Slope ONE
- After this lesson: All on the Line



## TI-Nspire™ Technology Skills:

- Download TI-Nspire document
- Open a document
- Move between pages
- Grab and drag a point
- Find the slope of a line segment

## Tech Tips:

- *Make sure the **font size** on your TI-Nspire handhelds is set to Medium.*

## Lesson Materials:

Student Activity

*Application\_of\_Slope\_Student.PDF*

*Application\_of\_Slope\_Student.DOC*

TI-Nspire document

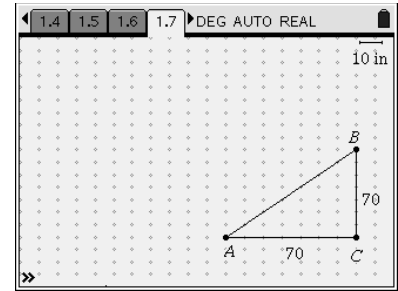
*Application\_of\_Slope.tns*



## Discussion Points and Possible Answers:

### TI-Nspire Problem/Pages 1.3 and 2.3

**Tech Tip:** If students experience difficulty dragging a point, check to make sure that they have moved the cursor (arrow) until it becomes a hand (☞) getting ready to grab the point. Also, be sure that the word point appears. Then press **ctrl** (⌘) (☞) to grab the point and close the hand (☞). When finished moving the point, press **esc** (⌫) to release.



<p>1. Will the slope of the staircase be positive or negative? How can you tell?</p>	<p><b>The slope will be positive because the line segment rises from left to right.</b></p>
<p>2. Now that segment <i>AB</i> has been changed, will the sign of the slope change? Explain.</p>	<p><b>The sign of the slope will not change, because the line segment still rises from left to right.</b></p>
<p>3. On page 1.6, use the <b>Slope</b> tool (<b>MENU &gt; Measurement &gt; Slope</b>) to find the slope of the staircase (segment <i>AB</i>). How does this slope compare to the building code requirement? How does the staircase need to change to meet the slope requirement?</p>	<p><b>The slope of the staircase is 1.71. This is larger than the building code requirement of 0.75. The staircase is too steep. By extending the staircase horizontally, the staircase can be made less steep.</b></p> <p><i>Teacher Tip:</i> When students are finished finding the slope of segment <i>AB</i>, press <b>esc</b> (⌫) to return to the pointer tool.</p>
<p>4. We know that slope is defined as the ratio of the vertical change to the horizontal change for any two distinct points. Using the height and length of the staircase, find the slope by hand. Show your work.</p>	$\frac{\text{vertical change}}{\text{horizontal change}} = \frac{120}{160} = \frac{12}{16} = \frac{3}{4} = 0.75$
<p>5. Determine the number of steps that would need to be built and explain your reasoning. Remember that each tread must be 10 inches.</p>	<p><b>Each tread is 10 inches, so the horizontal length of 160 inches should be divided by 10 inches. This would mean that 16 steps need to be built.</b></p>

# Application of Slope

TIMATH.COM: ALGEBRA



TEACHER NOTES

6. Determine the height of the risers and explain your reasoning.	<b>There will be 16 steps, so the vertical length of 120 inches should be divided by 16. This means each riser will be 7.5 inches in height.</b>
7. How will the slope of the new staircase be different from the staircase in Problem 1?	<b>The only change to the slope of the new staircase will be the sign.</b>
8. How can you determine the sign of the slope for the new staircase?	<b>The slope of the new staircase is falling from left to right. Therefore, the slope will be negative.</b>
9. Use the <b>Slope</b> tool ( <b>MENU &gt; Measurement &gt; Slope</b> ) to find the slope of the new staircase. How does the slope compare to your responses to Questions 7 and 8?	<b>The slope of the new staircase is <math>-0.75</math>. Comparisons may vary and are dependent on student responses to Questions 7 and 8.</b>

## Wrap Up:

Upon completion of the discussion, the teacher should ensure that students are able to:

- Recognize that a line with positive slope is rising from left to right and a line with a negative slope is falling from left to right.
- Use the slope ratio, vertical change over horizontal change, to find the slope of a line segment given the horizontal and vertical lengths.
- Understand how slope can be used to solve real-world problems.