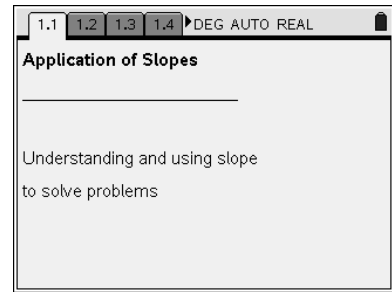




Understanding slope can be useful when solving real-world problems involving lines or line segments. It is important to understand the concept of slope, including what it means to have positive or negative slope.



- Open the TI-Nspire document *Application_of_Slope*.
- Press   to move to page 1.2 and begin the activity.

Suppose you are building a staircase between the first and second floors of a house, which is a height of 10 feet (120 inches). The *tread* is the depth of each step, and the *riser* is the height of each step. In order to follow the building code, the tread must be 10 inches and the slope of the staircase must be no greater than 0.75.

- Move to page 1.4.

On page 1.4 is a diagram of a staircase where point *A* represents the bottom, point *B* represents the top, and segment *AB* represents the slope of the staircase.

- Move to page 1.5.

1. Will the slope of the staircase be positive or negative? How can you tell?

- Move to page 1.7.

On page 1.7 is an outline of a staircase with segment *AB* representing the slope. Notice the scale in the top right corner indicating that the distance from one dot to the next on the grid represents 10 inches.

The staircase you are building needs to have a vertical height of 120 inches. Move the top step of the staircase by dragging point *B* until the height is 120 inches.

2. Now that segment *AB* has been changed, will the sign of the slope change? Explain.

3. Use the **Slope** tool (**MENU > Measurement > Slope**) to find the slope of the staircase (segment *AB*). How does this slope compare to the building code requirement? How does the staircase need to change to meet the slope requirement?

Manipulate the staircase by dragging points A and B until the slope is 0.75. Remember that the height must be 120 inches.

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.

5. Determine the number of steps that would need to be built and explain your reasoning. Remember that each tread must be 10 inches.

6. Determine the height of the risers and explain your reasoning.

➤ **Move to page 2.2.**

Suppose the same staircase is positioned in the opposite direction, like on page 2.2.

7. How will the slope of the new staircase be different from the staircase in Problem 1?

8. How can you determine the sign of the slope for the new staircase?

9. Use the **Slope** tool (**MENU > Measurement > Slope**) to find the slope of the new staircase. How does the slope compare to your responses to Questions 7 and 8?
