

## Section 5.3a – Slope

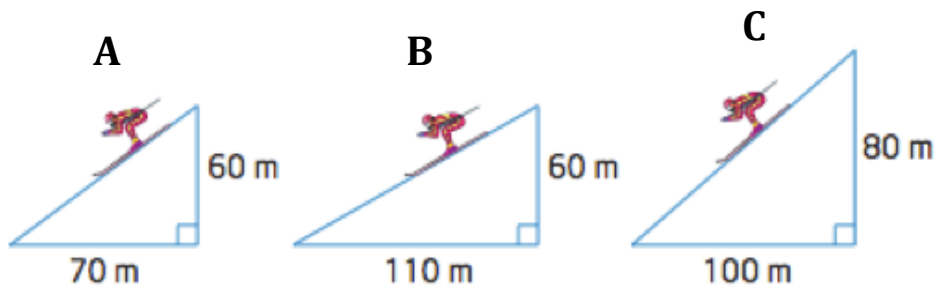
MPM1D

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### Investigation

**Slope:** A measurement of the steepness of a line.

The following diagrams represent ski hills.



1. Rank the hills in order of their steepness, from least to greatest.

i. \_\_\_\_\_

ii. \_\_\_\_\_

iii. \_\_\_\_\_

2. A hill rises 2 meters over a horizontal run of 8 meters. A second hill rises 4 meters over a horizontal run of 10 meters. Which is the steeper hill?

3. Describe your method for determining steepness:

## Part 1: How do we find the slope of a line?

The steepness of a line segment is measured by its \_\_\_\_\_. The slope is the ratio of the \_\_\_\_\_ to the \_\_\_\_\_ and is often represented by the letter \_\_\_\_\_.

You should maybe be starting to make a connection; what else did we use the letter  $m$  to represent?

\_\_\_\_\_ : the vertical distance between two points ( $\Delta y$ )

\_\_\_\_\_ : the horizontal distance between two points ( $\Delta x$ )

$$\text{Slope} = m = \frac{\text{rise}}{\text{run}} \quad \text{or} \quad \frac{\Delta y}{\Delta x}$$

**When determining the rise and run of a line from its graph you must know that:**

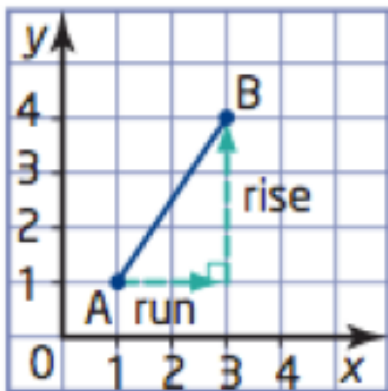
Counting units in the upward direction gives a \_\_\_\_\_ rise

Counting units in the downward direction gives a \_\_\_\_\_ rise

Counting units to the right gives a \_\_\_\_\_ run

Counting units to the left gives a \_\_\_\_\_ run

**Example 1:** Count the units on the grid to determine the rise and run.

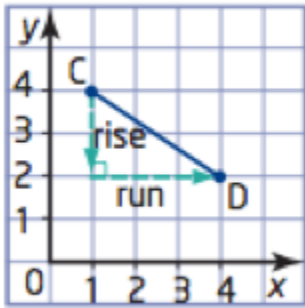


rise = \_\_\_\_\_

run = \_\_\_\_\_

What's the slope of this line?

**Example 2:** Count the units on the grid to determine the rise and run



rise = \_\_\_\_\_

run = \_\_\_\_\_

What's the slope of this line?

**Looking at example 1:**

Is the slope positive or negative? \_\_\_\_\_

What direction does the line go? \_\_\_\_\_

**Looking at example 2:**

Is the slope positive or negative? \_\_\_\_\_

What direction does the line go? \_\_\_\_\_

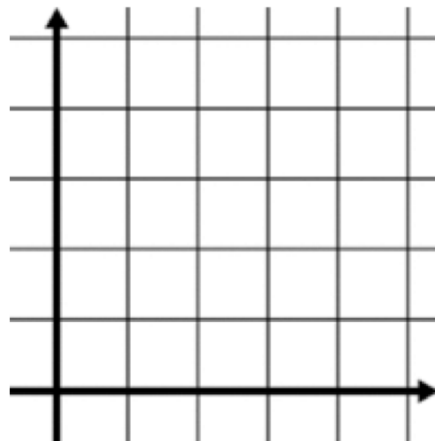
**Conclusion about positive and negative slopes:**

A line that \_\_\_\_\_ has a positive slope.

A line that \_\_\_\_\_ has a negative slope.

**Part 2: Finding the slope of vertical and horizontal lines**

**Step 1:** Plot the points A(1,1) and D(5,1) on the graph provided. Connect the points to form the line segment AD.



**Step 2:** Determine the rise and the run of line AD

rise =

run =

$m =$

The slope of any horizontal line is \_\_\_\_\_

**Step 3:** Plot the point E(1,5) on the same grid. Connect it to point A to form the line segment AE.

**Step 4:** Determine the rise and the run of line AE

rise =

run =

$m =$

The slope of any vertical line is \_\_\_\_\_

### **Part 3: Practice Finding Slopes**

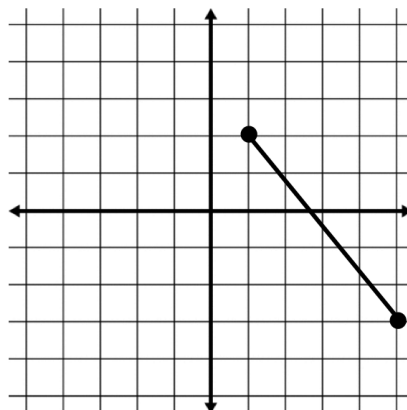
Calculate the slope of each line segments

**Example 3:**

rise is:

run is:

$m =$

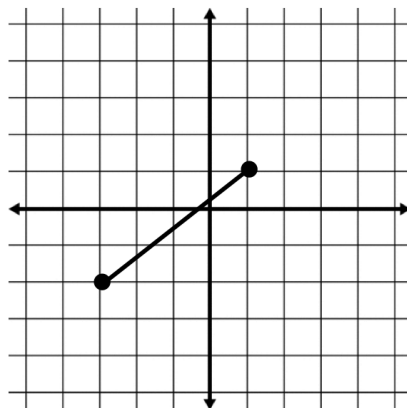


**Example 4:**

rise is:

run is:

$m =$



**Example 5:** The ramp at a loading dock rises 2.5 meters over a run of 4 meters.

What is the slope of the ramp?

