

Juggling Slope

Lesson Plan

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Teacher Mentor: Sandra Fugett

Goal: Use juggling patterns to introduce slope.

Grade and Course: 9th grade Algebra I

KY Standards: MA-HS-G-S-CG1, MA-HS-NPO-S-RP3

Objectives: The students should gain an intuitive idea of what the slope is and how to compute the slope of a line given two points on the line. They should also be able to determine when a slope is positive, negative, zero, or undefined just by looking at the graph.

Resources/materials needed: Worksheet, juggling equipment (if you plan on juggling yourself), OR juggling videos/photos (if you do not yet know how to juggle), smart board or overhead projector.

Description of Plan: The instructor should lead the students through the first two pages of the worksheet. Here, students should get an intuitive idea of slope and actually derive the formula for finding slope. In the original lesson, the third page was used for when the instructor stood in front of a smart board (with x,y-axis) and juggled. At various times throughout the performance, the instructor stopped in the middle of a pattern holding the juggling balls in place. A student marked on the board where the shadows of two juggling balls were. Using these marked points, the class found the slope of the juggling pattern. It was during this “performance” that the slope of horizontal and vertical lines was introduced. For the juggling-challenged, this section can be replaced by juggling videos or pictures, which are readily available online. The last page contains problems for the students to work.

Lesson Source: Eric Clark

Instructional Mode: Lecture, discussion, and demonstration

Date Given: 02/19/08

Estimated Time: 1 day

Date Submitted to Algebra³: 04/01/08

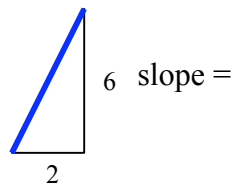
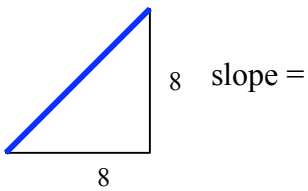
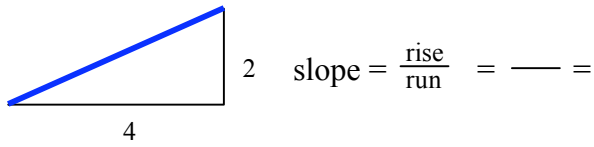
Introduction to Slope

DEFINITION: The **slope** of a line is the ratio of vertical distance (rise) to horizontal distance (run).

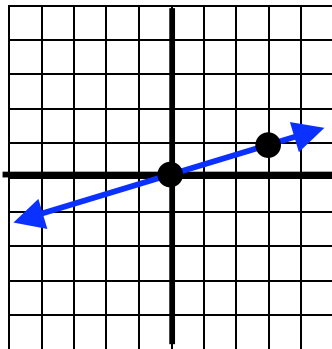


That is, slope = $\frac{\text{rise}}{\text{run}}$

EXAMPLES:



Suppose we have a line that passes through the points (0,0) and (3,1).

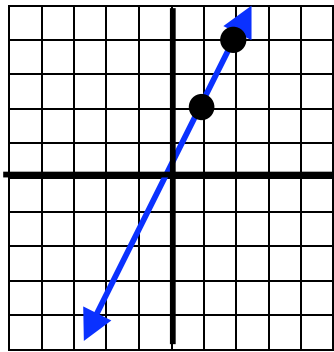


rise: _____

run: _____

slope: _____

What if we had a line through the points (1,2) and (2,4)?



rise: _____

run: _____

slope: _____

FORMULA

What if a line runs through the points (x_1, y_1) and (x_2, y_2) ?

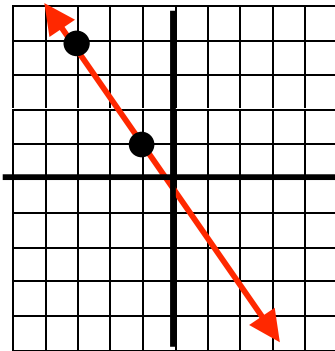
rise: _____

run: _____

slope =

EXAMPLE

A line through the points $(-1, 1)$ and $(-3, 4)$



slope =

REMARK

Lines with a **positive slope** run _____ and to the right.

Lines with a **negative slope** run _____ and to the right.

Juggling Slopes

Pattern 1: The pattern goes through the points _____ and _____.
Find the slope.

Pattern 2: The pattern goes through the points _____ and _____.
Find the slope.

Pattern 3: The pattern goes through the points _____ and _____.
Find the slope.

Pattern 4: The pattern goes through the points _____ and _____.
Find the slope.

REMARK:

Horizontal lines have a slope of _____.

Vertical lines have an _____ slope.

Practice

Find the slope of the line passing through the two given points.

1. $(-1,3)$ and $(2,6)$.

2. $(0,5)$ and $(-2,-2)$.

3. $(1,8)$ and $(-3, 8)$.

4. $(-3,7)$ and $(-3, -5)$.

5. $(-1,-2)$ and $(-5,-4)$.

6. $(9,1)$ and $(3,0)$.

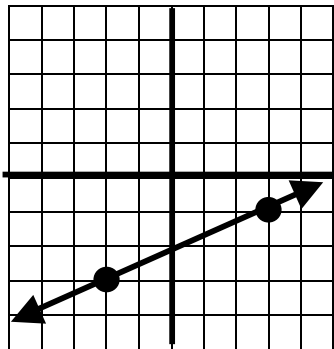
Find the missing values.

7. A line with slope = 2 goes through the points $(1,-3)$ and $(2,y_2)$.

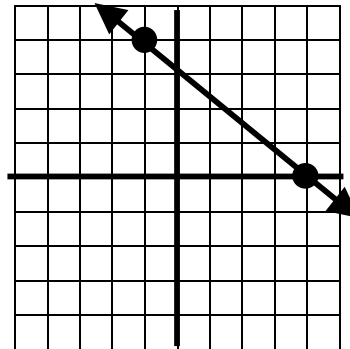
8. A line with slope = $^{-1}/_2$ goes through the points $(0,5)$ and $(x_2,1)$.

Find the slope of the given line.

9.

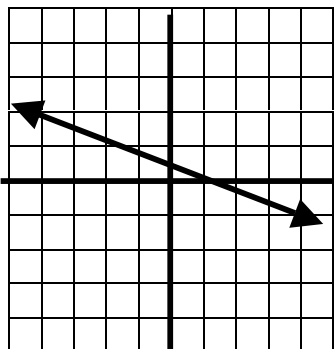


10.



Determine whether the slope is positive or negative **without** calculating it.

11.



12.

