

## S.ID.C.7 Interpret Slope and Intercept

# EQUATIONS AND INEQUALITIES

## S.ID.C.7 Interpret Slope and Intercept

### C. Interpret linear models

7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

#### Overview of Lesson

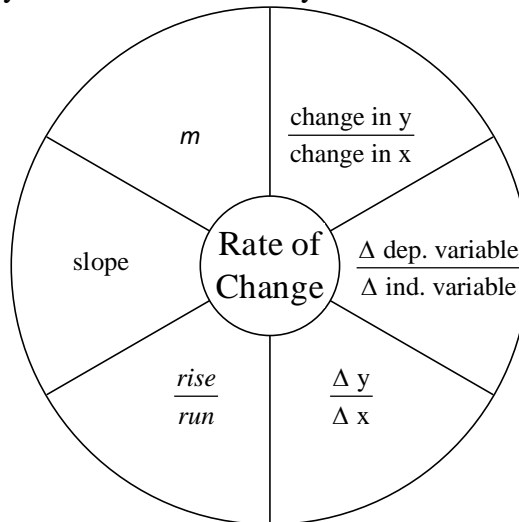
- activate prior knowledge and review learning objectives (see above)
- explain vocabulary and/or big ideas associated with the lesson
- connect assessment practices with curriculum
- model an assessment problem and solution strategy
- facilitate guided discussion of student activity
- facilitate guided practice of student activity

#### Selected problem set(s)

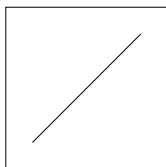
- facilitate a summary and share out of student work

Homework – Write the Math Assignment

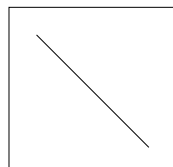
Rate of Change goes by many different names. They all mean the same thing,



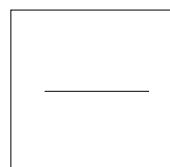
$$\text{Rate of Change} = m = \text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{\Delta \text{ dep. variable}}{\Delta \text{ ind. variable}} = \frac{\text{change in } y}{\text{change in } x}$$



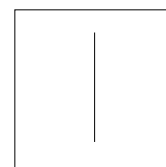
**Positive Slope**  
Goes up from left to right.



**Negative Slope.**  
Goes down from left to right.



**Zero Slope.**  
A horizontal line has a slope of zero.



**Undefined Slope.**  
A vertical line has an undefined slope.

### **Two ways to measure slope.**

- Use the slope formula.
- Make a right triangle and measure the legs.

### **Slope Formula:**

$$slope = m = \frac{y_2 - y_1}{x_2 - x_1}$$

### **Measuring the Legs of Right Triangles:**

You can

use right triangles to measure or calculate the slope of any straight line.

1. Identify the coordinates of any two points on a line.
2. Determine if the slope of the line is positive or negative.
3. Make a right triangle using the two given end-points as vertices on either end of the hypotenuse. (One leg will be parallel to the x-axis and the other leg will be parallel to the y-axis.)
4. Calculate or measure the height and the base of the right triangle.
5. Record the height and base of the triangle as a fraction in the form of

$$\frac{\text{height}}{\text{base}} = \frac{\text{rise}}{\text{run}} = m = \text{slope} .$$

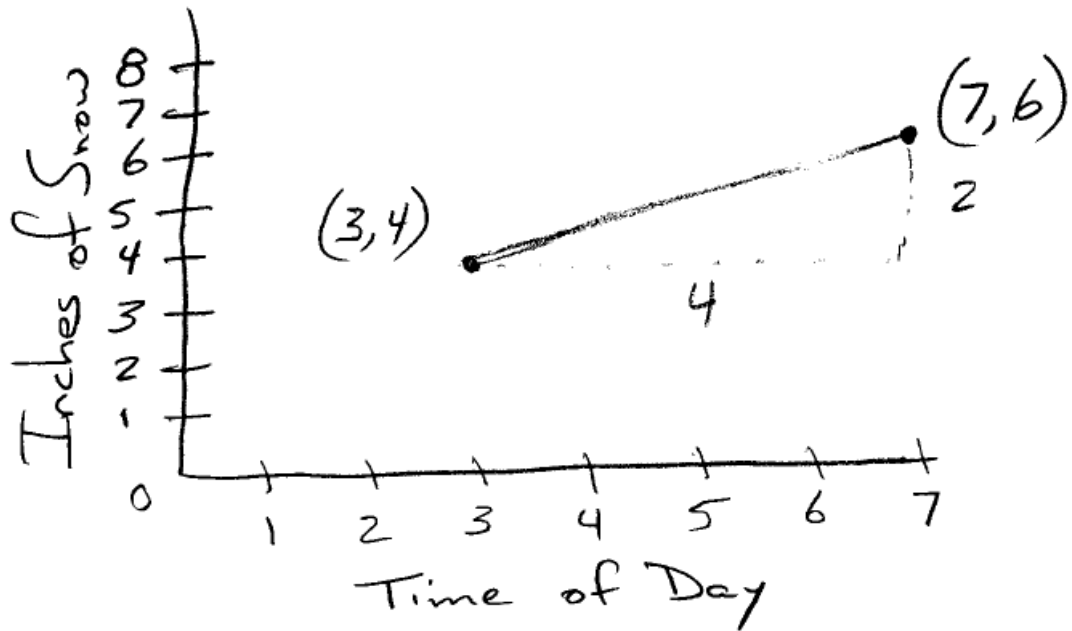
6. When you combine your fraction with the sign of the slope of the line, you have the “algebraic” slope of the line.

## **REGENTS PROBLEM TYPICAL OF THIS STANDARD**

1. During a recent snowstorm in Red Hook, NY, Jaime noted that there were 4 inches of snow on the ground at 3:00 p.m., and there were 6 inches of snow on the ground at 7:00 p.m. If she were to graph these data, what does the slope of the line connecting these two points represent in the context of this problem?

**S.ID.C.7 Interpret Slope and Intercept**  
**Answer Section**

1. ANS:



$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - 4}{7 - 3} = \frac{2 \text{ inches of snow}}{4 \text{ hours}}$$

The slope represents the rate of snowfall, which is 2 inches of snow every 4 hours.

PTS: 2

REF: 061630ai

NAT: F.IF.B.6

TOP: Modeling Linear Functions

## Homework - Write the Math Assignment

START Write your name, date, topic of lesson, and class on your paper.  
NAME: Mohammed Chen  
DATE: December 18, 2015  
LESSON: Missing Number in the Average  
CLASS: Z

- PART 1a. Copy **the problem** from the lesson and underline/highlight key words.  
PART 1b. State your understanding of **what the problem is asking**.  
PART 1c. **Answer** the problem.  
PART 1d. Explanation of **strategy** with all work shown.
- PART 2a. Create **a new problem** that addresses the same math idea.  
PART 2b. State your understanding of **what the new problem is asking**.  
PART 2c. **Answer** the new problem.  
PART 2d. Explanation of **strategy** used in solving the new problem with all work shown.

### Clearly label each of the eight parts.

#### Grading Rubric

Each homework writing assignment is graded using a four point rubric, as follows:

Part 1. The Original Problem	<b>Up to 2</b> points will be awarded for: a) correctly restating the original problem; b) explicitly stating what the original problem is asking; c) answering the original problem correctly; and d) explaining the math.
Part 2. My New Problem	<b>Up to 2</b> points will be awarded for: a) creating a new problem similar to the original problem; b) explicitly stating what the new problem is asking; c) answering the new problem correctly; and d) explaining the math.

This assignment/activity is designed to incorporate elements of [Polya's four step universal algorithm](#) for problem solving with the idea that writing is thinking. Polya's four steps for solving any problem are:

1. Read and understand the problem.
2. Develop a strategy for solving the problem.
3. Execute the strategy.
4. Check the answer for reasonableness.

## EXEMPLAR OF A WRITING THE MATH ASSIGNMENT

### Part 1a. The Problem

TOP Electronics is a small business with five employees. The mean (average) weekly salary for the five employees is \$360. If the weekly salaries of four of the employees are \$340, \$340, \$345, and \$425, what is the salary of the fifth employee?

### Part 1b. What is the problem asking?

Find the salary of the fifth employee.

### Part 1c. Answer

The salary of the fifth employee is \$350 per week.

### Part 1d. Explanation of Strategy

The arithmetic mean or average can be represented algebraically as:

$$\bar{X} = \frac{x_1 + x_2 + \dots + x_n}{n}$$

I put information from the problem into the formula. The problem says there are 5 employees, so  $n = 5$ . The problem also gives the mean (average) salary and the salaries of 4 of the employees. These numbers can be substituted into the formula as follows:

$$360 = \frac{340 + 340 + 345 + 425 + x_5}{5}$$

$$1800 = 340 + 340 + 345 + 425 + x_5$$

$$1800 = 1450 + x_5$$

$$1800 - 1450 = x_5$$

$$350 = x_5$$

$$\text{Check: } 360 = \frac{340 + 340 + 345 + 425 + 350}{5} = \frac{1800}{5} = 360$$

### Part 2a. A New Problem

Joseph took five math exams this grading period and his average score on all of the exams is 88. He remembers that he received test scores of 78, 87, 94, and 96 on four of the examinations, but he has lost one examination and cannot remember what he scored on it. What was Joseph's score on the missing exam?

### Part 2b. What is the new problem asking?

Find Joseph's score on the missing exam.

### Part 2c. Answer to New Problem

Joseph received a score of 85 on the missing examination.

### Part 2d. Explanation of Strategy

I substitute information from the problem into the formula for the arithmetic mean, as follows:

$$88 = \frac{78 + 87 + 94 + 96 + x_5}{5}$$

$$440 = 355 + x_5$$

$$85 = x_5$$

$$88 = \frac{78 + 87 + 94 + 96 + 85}{5} = \frac{440}{5} = 88$$

The answer makes sense.