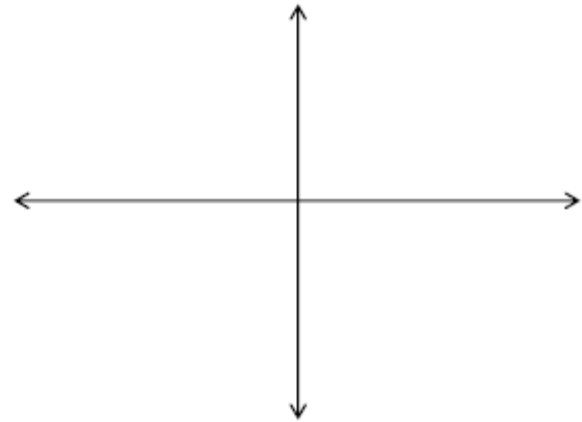# Lesson 4.1 Finding and Interpreting Slope

Week 8 Wednesday Course 3 Warm-up

Find the Slope
(2, -5) (3, 4)

Sketch the points (2, -5) and (3, 4)

Solve an Equation Containing Fractions

$$\frac{1}{5} + \frac{3w}{15} = \frac{4}{5}.$$

Write number in scientific notation
46,205,000

Simplify Expression

$$a \cdot b \cdot a^5$$

Solve an Equation Containing Decimals
$0.11p + 1.5 = 2.49$

Solve & Check
$5x - 12 = 3x + 24$

Lesson 4.1 Finding and Interpreting Slope

Week 8 Wednesday Course 3 Warm-up

Find the Slope
(2, -5) (3, 4)

$$\frac{4-(-5)}{3-2} = \frac{9}{1} = 9$$
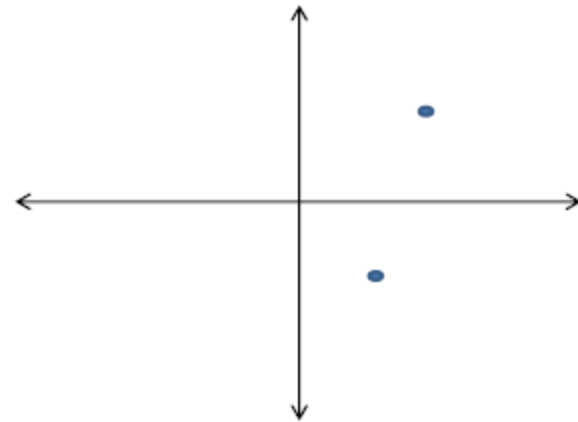
Given two points:

(x_1, y_1) (x_2, y_2)

Slope Formula:

$$\frac{y_2 - y_1}{x_2 - x_1}$$

Paradise Education Center
Soaring Above The Rest!

Sketch the points (2, -5) and (3, 4)

Solve an Equation Containing Fractions

$$\frac{1}{5} + \frac{3w}{15} = \frac{4}{5}.$$

3

Write number in scientific notation
46,205,000

4.6205 x 10 ^7

Simplify Expression

$a \cdot b \cdot a^5$

$$a^6 b$$

Solve an Equation Containing Decimals
$0.11p + 1.5 = 2.49$
9

Solve & Check
$5x - 12 = 3x + 24$
X=18

Lesson 4.1 Finding and Interpreting Slope (Day 2)

Objective

TSW find the slope of lines by

*interpreting table

*graphing

*using slope formula $= \dfrac{y_2 - y_1}{x_2 - x_1}.$

*using formula y=mx+b

BIG IDEA

▶ The graph of a linear equation in two variables is a line, and you can write the equation of the line in slope-intercept form.

Common Core State Standards

8EE 5 Graph proportional relationships, interpreting the unit rate as the slope of a graph.

8 EE 6 …derive the equation y=mx for a line through the equation y=mx+b for a line intercepting the vertical axis at b

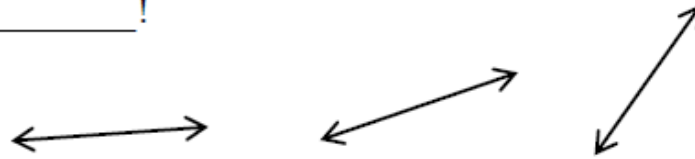- **Mathematical Practices** *2 Reason 4 Model Mathematics 5 Use tools 8 Express regularity in reasoning*

Lesson 4.1 Types of Slope (Day 3)

Let's review Knowledge of Slope…

Slope!

The steepness of a line is called _____!

Circle the line with the biggest slope… ←——→   ↗   ↗

The letter we use for slope is a lowercase ____! Why?! Because it comes from the French word *monter* which means to climb or to rise. FUN FACT!

When given a graph of a line, we need to know a simple definition of slope:

m =

** Slope is the ratio of a line's _____ change to its _____ change.
That's what we mean by *"rise over run"*!

Lesson 4.1 Types of Slope (Day 3)

Let's review Knowledge of Slope…

Slope!

The steepness of a line is called _SLOPE_ !

Circle the line with the biggest slope…

The letter we use for slope is a lowercase _m_ ! Why?! Because it comes from the French word *monter* which means to climb or to rise. FUN FACT!

When given a graph of a line, we need to know a simple definition of slope:

$$m = \frac{RISE}{RUN}$$

** Slope is the ratio of a line's _VERTICAL_ change to its _HORIZONTAL_ change. That's what we mean by "*rise over run*"!

Lesson 4.1 Types of Slope (Day 3)

Let's review Knowledge of Slope…

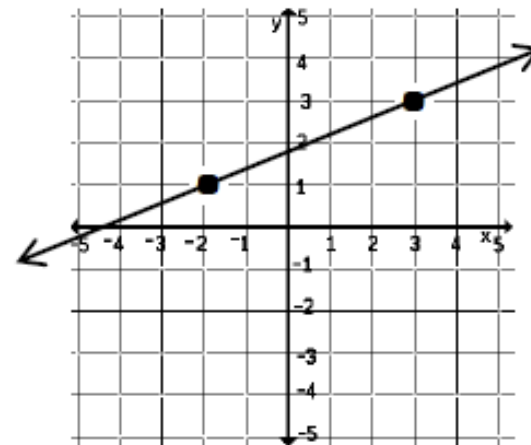*How to find the slope of a line when given a graph of a line:*

1) Start at the point farthest to the _____!

2) Find the *rise!*   Up: _____
                      Down: _____

3) Find the *run!*   Right: _____
                     Left: _____

Lesson 4.1 Types of Slope (Day 3)

Let's review Knowledge of Slope…

How to find the slope of a line when given a graph of a line:

1) Start at the point farthest to the _LEFT_ !

2) Find the *rise!*   Up: _POSITIVE_
   Down: _NEGATIVE_

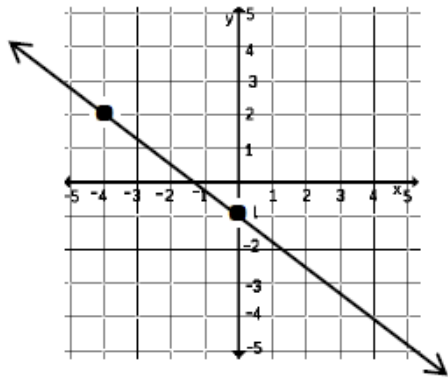3) Find the *run!*   Right: _POSITIVE_
   Left: _NEGATIVE_
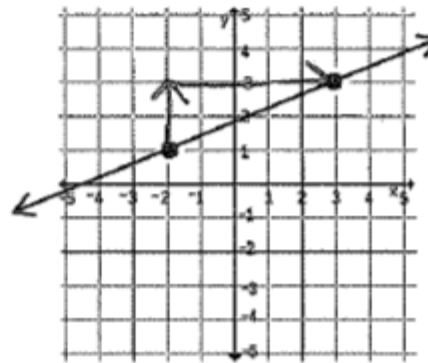
$$M = \frac{2}{5}$$
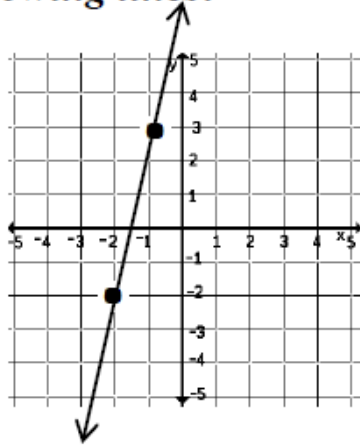
Lesson 4.1 Types of Slope (Day 3)
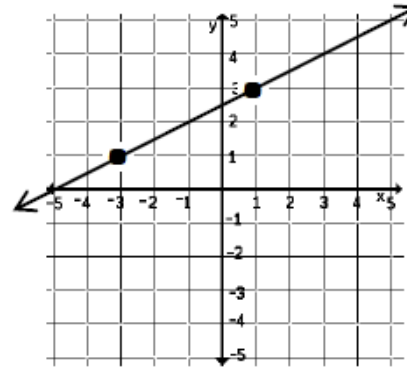
Let's review Knowledge of Slope…

Find the slope of the following lines!

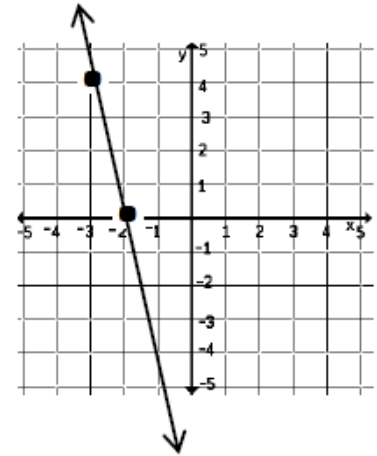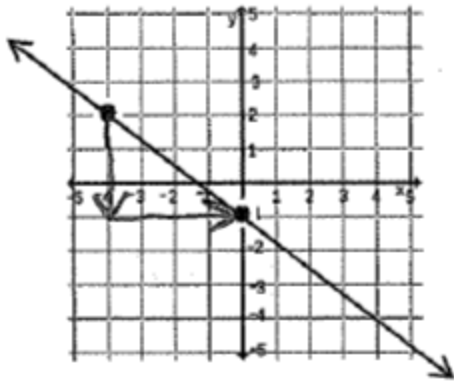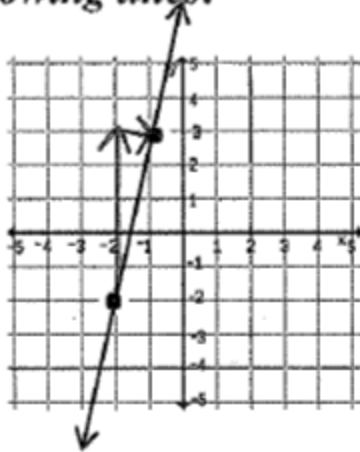m =   m =   m =   m =

Lesson 4.1 Types of Slope (Day 3)

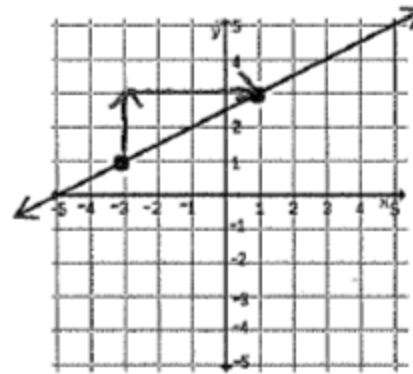**Let's review Knowledge of Slope…**

Find the slope of the following lines!

$$m = \boxed{\dfrac{-3}{4}}$$

$$m = \dfrac{5}{1} = \boxed{5}$$

$$m = \dfrac{2}{4} = \boxed{\dfrac{1}{2}}$$
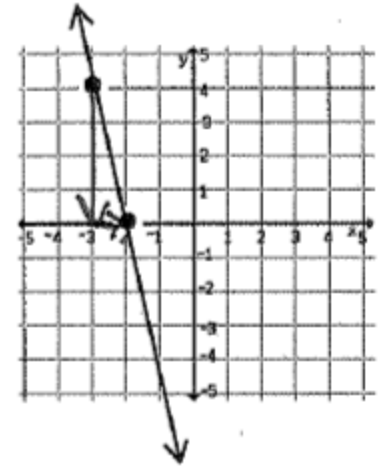
$$m = \dfrac{-4}{1} = \boxed{-4}$$

Lesson 4.1 Types of Slope (Day 3)

Let's review Knowledge of Slope…

Horizontal and Vertical Lines…

Horizontal Line

Slope =

Vertical Line

Slope =

Lesson 4.1 Types of Slope (Day 3)

Let's review Knowledge of Slope…

Horizontal and Vertical Lines…

Horizontal Line
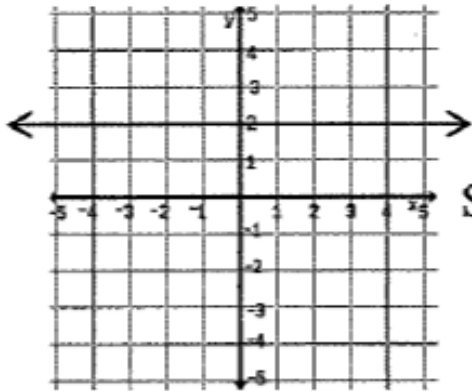
Slope = $\bigcirc$

Vertical Line
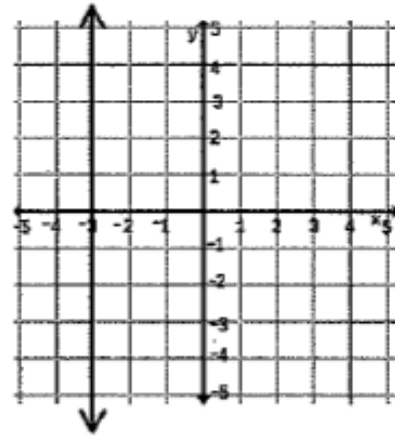
Slope = UNDEFINED

Lesson 4.1 Types of Slope (Day 3)

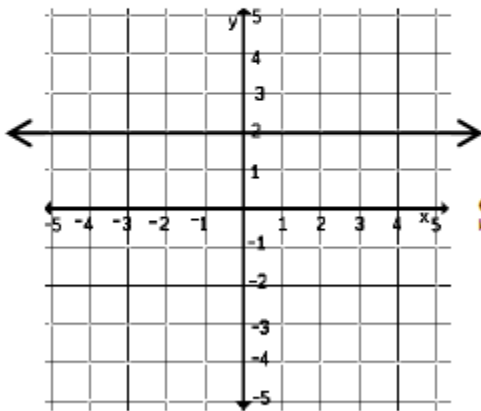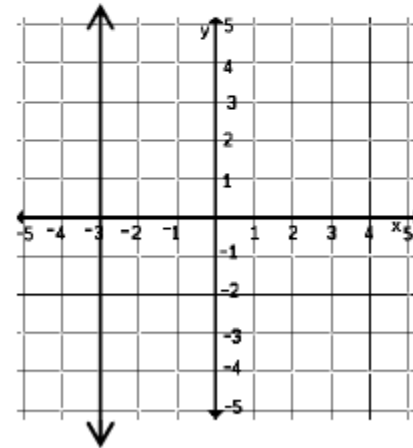Sometimes we are not given a picture, but instead we are given 2 points on the line. When this is the case, we must implement another definition of slope:

$$m = \boxed{}$$

In other words, slope is $\dfrac{\textit{Change in}}{\textit{Change in}}$

How to find the slope of a line when given two points on the line:

1) Subtract one y-value from another y-value!
   (It helps to draw arrows!)

2) Subtract one x-value from another x-value!
   (It helps to draw arrows!)

IMPORTANT:
* Subtracting a negative means _____!

(1, 7) and (-2, 3)

Lesson 4.1 Types of Slope (Day 3)

Let's review Knowledge of Slope…

Sometimes we are not given a picture, but instead we are given 2 points on the line. When this is the case, we must implement another definition of slope:

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

In other words, slope is $\dfrac{\text{Change in } y}{\text{Change in } x}$

How to find the slope of a line when given two points on the line:

1) Subtract one y-value from another y-value!
   (It helps to draw arrows!)

2) Subtract one x-value from another x-value!
   (It helps to draw arrows!)

IMPORTANT:
* Subtracting a negative means __ADDITION__!

$(1, 7)$ and $(-2, 3)$

$$\frac{7-3}{1+2} = \boxed{\frac{4}{3}}$$

Lesson 4.1 Types of Slope (Day 3)

Let's review Knowledge of Slope…

Find the slope of the line that passes through each pair of points:

(6, -1) & (4, 2)   (4, 3) & (3, -2)   (-1, 7) & (-3, 1)   (3, 4) & (6, 5)

Lesson 4.1 Types of Slope (Day 3)

Let's review Knowledge of Slope…

Find the slope of the line that passes through each pair of points:

(6, -1) & (4, 2)

$$\frac{-1-2}{6-4} = \boxed{\frac{-3}{2}}$$

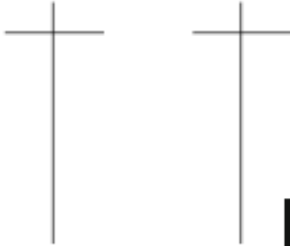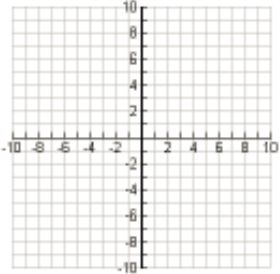(4, 3) & (3, -2)

$$\frac{3+2}{4-3} = \frac{5}{1} = \boxed{5}$$

(-1, 7) & (-3, 1)

$$\frac{7-1}{-1+3} = \frac{6}{2} = \boxed{3}$$

(3, 4) & (6, 5)

$$\frac{4-5}{3-6} = \frac{-1}{-3} = \boxed{\frac{1}{3}}$$

Lesson 4.1 Types of Slope (Day 3)

From a Table	From a Graph
1. Find the _____ _____ of the x and y values 2. Write the slope as _____	1. Choose two _____ on the line 2. Count the _____ then the _____ 3. Write the slope as _____

What is SLOPE?

Slope describes the _____ of a line.

_____   _____

From an Equation	From Two Points
1. Solve the equation for _____ 2. Slope is the _____ of _____ therefore, it is next to the variable _____. 3. The slope is the _____ of x. $y = mx + b$	1. Label the ____ and ____ coordinates. 2. Find the _____ of y and the _____of x by _____ 3. Write the slope as the _____ of _____ over the _____ of _____.

Two ways to find slope include…
*From table
*From Graph
Today let's focus on finding slope
*From Two points

Lesson 4.1 Types of Slope (Day 3)

_____

1. Label the ____ and ____ coordinates.
2. Find the _____ of y and the _____ of x by _____
3. Write the slope as the _____ of ____ over the _____ of _____.

From Two Points

Two ways to find slope include…
*From table
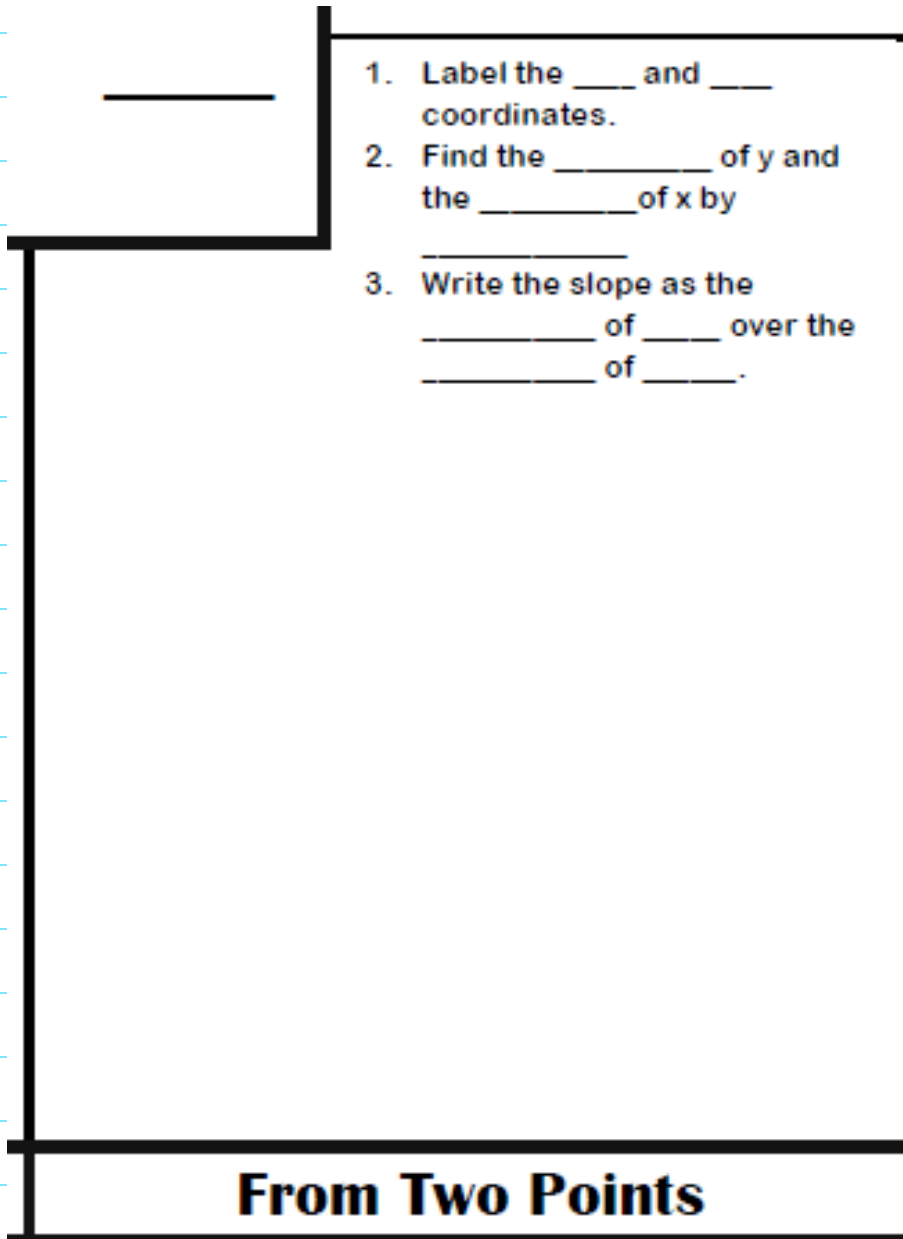*From Graph
Today let's focus on finding slope
*From Two points

Lesson 4.1 Types of Slope (Day 3)

$\dfrac{\text{rise}}{\text{run}}$

$\dfrac{y-y}{x-x}$

1. Label the X and y coordinates.
2. Find the change of y and the change of x by subtracting
3. Write the slope as the change of y over the change of X.

1. $(-4, 7)$ $(-6, -4)$

$\dfrac{7 + (-4)}{-4 + (+6)} = \dfrac{11}{2}$

2. $(3, 0)$ $(-11, -15)$

$\dfrac{0 - (-15)}{3 + (+11)} = \dfrac{15}{14}$

3. $(3, -20)$ $(5, 8)$

$\dfrac{-20 - 8}{3 - 5} = \dfrac{-28}{-2} = \dfrac{14}{1}$

From Two Points

Two ways to find slope include…
*From table
*From Graph
Today let's focus on finding slope
*From Two points

Lesson 4.1 Types of Slope (Day 3)

Find the slope of each line.

a) Find the slope of the line passing through the points A (4, 8) and B (1,

Lesson 4.1 Types of Slope (Day 3)

Find the slope of each line.

a) Find the slope of the line passing through the points $A\ (4, 8)$ and $B\ (1, 4)$.

Solution

Let $A\ (4, 8)$ be (x_1, y_1) and $B\ (1, 4)$ be (x_2, y_2).

Method 1

$$\text{Slope} = \frac{y_1 - y_2}{x_1 - x_2}$$

$$= \frac{8 - 4}{4 - 1}$$

$$= \frac{4}{3}$$

Method 2

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{4 - 8}{1 - 4}$$

$$= \frac{-4}{-3} = \frac{4}{3}$$

The slope is $\frac{4}{3}$.

> You can find the slope of the line by calculating the rise and the run either from point A to point B or from point B to point A.

Lesson 4.1 Types of Slope (Day 3)

b)   Find the slope of the line passing through the points P (2, 5) and Q (8, 2).

b) Find the slope of the line passing through the points $P\,(2, 5)$ and $Q\,(8, 2)$.

Solution

Let $P\,(2, 5)$ be (x_1, y_1) and $Q\,(8, 2)$ be (x_2, y_2).

Method 1

$$\text{Slope} = \frac{y_1 - y_2}{x_1 - x_2}$$

$$= \frac{5 - 2}{2 - 8}$$

$$= \frac{3}{-6} = -\frac{1}{2}$$

Method 2

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{2 - 5}{8 - 2}$$

$$= \frac{-3}{6} = -\frac{1}{2}$$

The slope is $-\frac{1}{2}$.

Lesson 4.1 Finding and Interpreting Slope (Day 3)

Independent Practice #7-10

Find the slope of the line passing through each pair of points.

7 $A (-10, 3), B (0, 3)$

8 $S (5, -2), T (2, -$

9 $P (0, -7), Q (-3, 5)$

10 $X (4, 4), Y (4, -2)$

Challenge- Solve created equation/

Name:_____

Wednesday Homework
Solve For Linear Equation #1-20

Solve for each unknown.

$(-3) \cdot g = (-3)$	$p \cdot (-23) = 11$
$d \cdot 3 = (-13)$	$p + 14 = 24$
$5 = f + (-19)$	$(-11) + w = 11$
$m + 13 = (-2)$	$7 = q + (-11)$
$17 = 16 + r$	$r \cdot 0 = (-7)$
$(-33) = (-15) \cdot q$	$u \cdot (-3) = (-21)$
$(-10) \cdot b = (-13)$	$q \cdot 11 = 11$
$7 = m \cdot (-25)$	$14 = k + (-10)$
$26 = 25 + q$	$(-5) + q = (-3)$
$25 = 25 \cdot p$	$(-18) + b = (-23)$

✓ Lesson Check –#7 Write Slope of line using two points (slope formula)