**Unit 3 - Equations in Two Variables**



Lesson 1: Finding Slope Graphically.
Objective: Today we will find the slope of a line given the graph.
Standard: 8.EE.6

The steepness of a line is called \_\_\_\_\_\_\_!

***Circle the line with the biggest slope…***

Slope is identified by the variable $m$.

**Slope Formula:** $m=$

\*\* Slope is the ratio of a line’s \_\_\_\_\_\_\_\_ change to its ­­­­\_\_\_\_\_\_\_\_\_\_ change. That’s what we mean by “*rise over run”!*

**

**Example:**

1) Start towards the left of the graph.

2) Find the *rise* from one point to the next
 Up: \_\_\_\_\_\_\_\_

 Down: \_\_\_\_\_\_\_\_
3) Find the *run*  from one point to the next
 Right: \_\_\_\_\_\_\_\_

**Try It! *Find the slope of the following lines!***

m = m = m = m =

Lesson 2: Finding slope algebraically.
Objective: Today we will find the slope of a line algebraically.
Standard: 8.EE.6

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

 $m= $ In other words, slope is

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

1) Subtract one y-value from another y-value!

 (It helps to label the points!)

2) Subtract one x-value from another x-value!

 (It helps to label the points!)

**Subtract from ordered pairs in the same order!**

**Examples:**

|  |  |
| --- | --- |
| $$x$$ | $$y$$ |
| **1** | **3** |
| **2** | **6** |
| **3** | **9** |
| **4** | **12** |

$\left(-2, 3\right) and (1, 7)$

Lesson 3: Comparing slopes.
Objective: Today we will compare slopes in different forms.
Standard: 8.EE.5

**Finding slope from an equation:**

* The equation must be in the form $\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$
This is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* The value \_\_\_\_, or the coefficient of x, is the slope of the equation.

We can compare the slope from a \_\_\_\_\_\_\_, from an \_\_\_\_\_\_\_\_\_\_, and from a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Example:**

Below are representations of Jesse, Troy, and Lucy’s usage of gas. Who has the highest miles per gallon?



Lesson 4: Understanding Slope and Y-Intercept.
Objective: Today we will identify the y-intercept and slope from the graph of a linear equation.
Standard: 8.F.4



The point where the line crosses the y-axis is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How do we find the slope of a line graphically? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the slope formula? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What letter do we use to represent slope? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Lesson 5: Writing the equation of a line in slope-intercept form.
Objective: Today we will write the equation of a line in slope-intercept form.
Standard: 8.F.4

To write the equation of a line we need two pieces of information

 \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the point where the line crosses the \_\_\_\_\_\_\_\_\_\_.

The slope-intercept form of a line is $\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$

The $m$ represents the \_\_\_\_\_\_\_\_\_\_\_

The $b$ represents the \_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Find the slope or y-intercept from each equation.**

****

1. **Write the equation for each line given.**



1. **Write the equation of each line from the graph.**

What two pieces of information do we need in order to write the equation of a line?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Lesson 6: Writing the equation of a line in slope-intercept form given the slope and a point.
Objective: Today we will write the equation of a line in slope-intercept form given the slope and a point.
Standard: 8.F.4

**When Given the Slope and a Point:**

1. Substitute the slope for $m$ in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equation.
2. Substitute the point for $\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_ $ into the equation.
3. Use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to solve for $b$.

**Example:**

Write the equation of the line with a slope of $-2$ that passes through
the point (3, -5).

Write the equation of the line with a slope of $\frac{2}{3}$ that passes through
the point (6, 2).

Lesson 7: Writing the equation of a line in slope-intercept form given two points.
Objective: Today we will write the equation of a line in slope-intercept form given two points.
Standard: 8.F.4

**When Given Two Points:**

What information are we missing in order to write the equation of a line?
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How do we find the slope given two points? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Steps:

1. Find the slope
2. Use one point and the slope to find the $\\_\\_\\_\\_\\_\\_$.
3. Write the final equation.

**Example:**

Write the equation of the line in slope-intercept form that passes through the points $(3, 2)$ and $(5, 4)$.

Write the equation of the line in slope-intercept form that passes through the points $(3, -6)$ and $(-1, 2)$.

Lesson 8: Solving equations for y.
Objective: Today we will rewrite linear equations in slope-intercept form.
Standard: 8.F.3

To be able to identify the slope and y-intercept of a line, the equation needs to be in the form $\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$.



Lesson 9: Graph a line from a table.
Objective: Today we will graph a linear equation from a table.
Standard: 8.F.3

Steps:

1. Pick three \_\_\_\_\_\_\_\_\_\_\_\_\_
2. Substitute x-values into the equation to find \_\_\_\_\_\_\_\_\_\_\_\_\_
3. Use the ordered pairs to plot and make a line
4. Extend the line, put arrows on both ends, and label the line with the equation



Lesson 10: Graph lines in slope-intercept form.
Objective: Today we will use the slope-intercept form of a line to graph the line.
Standard: 8.F.3

**Graphing Using Slope-Intercept:**

1. Identify the \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ from the equation.
2. Plot the \_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Use the slope to get additional points (at least 3)
4. Connect and extend
5. Label

**Examples:**

Graph the lines:

$y=x+1$ $y=-\frac{1}{4}x-1$

$m=\\_\\_\\_\\_$ $b=\\_\\_\\_\\_$ $m=\\_\\_\\_\\_$ $b=\\_\\_\\_\\_$



Lesson 11: Graphing a linear equation when you are not given slope-intercept form.
Objective: Today we will convert a linear equation into slope-intercept form to graph the line.
Standard: 8.F.3

Sometimes you are given an equation that is not in slope intercept form:

$$\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$

Your line **MUST** be in slope-intercept form for you to be able to graph the line.

1. Write in slope-intercept form ($y=mx+b$)
2. Identify the \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ from the equation.
3. Plot the \_\_\_\_\_\_\_\_\_\_\_\_\_.
4. Use the slope to get additional points (at least 3)
5. Connect and extend
6. Label

**Example:**Graph the linear equation.

$$3x-4y=12$$

Slope-Intercept Form
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

$m=\\_\\_\\_\\_$ $b=\\_\\_\\_\\_$