

**?**

**W**

**2K**

**Lesson Question**

**Words to Know**

*Fill in this table as you work through the lesson. You may also use the glossary to help you.*

**Using Slope- Intercept Form**

**Write** a linear equation.

**Determine**

and *y*-intercept.

**Graph** a

function.

**Lesson Goals**

|  |  |
| --- | --- |
| locate | to find the of something |
| linear equation | an equation whose solutions form a line on a coordinate plane |
| slope | the ratio of the change in the dependent values (outputs)  to the change in the values (inputs) between two points on a line |



**W**

**2K**



−4

4



4  0

3  (2)

*m* 

5

−2

run 

rise

4

2

−2

−4

*x*

(*x*2, *y*2)

(*x*1, *y*1)

2

Rise

(−2, ) ( , 4)

Using the slope formula:

Run

4

**Review of Slope**

* **Find the slope of the line.**

*y*

**Words to Know**

|  |  |
| --- | --- |
| slope-intercept form | the form of a linear relation that is written as *y* = *mx* + *b*, where *m* and *b* are numbers, *m* is the slope  and *b* is the *y*-intercept of the line |
| *y*-intercept | the *y*-coordinate of the point where the graph of a line  crosses the |

**2**

-value is any number

For points that are not *y*-intercepts, notice the except for 0.

.

(−4, −4)

For points that are *y*-intercepts, notice the *x*-value is always



 3

1 

 0,  4 

 2 ,  5



**Not *y*-Intercepts**

(−10, 0)

(2, 7)

**Comparing and Contrasting**

***y*-Intercepts**

(0, −3.5)

(0, 18)

(0, 0)

**Slide**



**Time (weeks)**

5

4

3

2

1

(0, )

10 (0, 15)

*x*

(0, 15)

20

The ***y***-**intercept** is the point on a graph at which the graph crosses the *y*-axis.

30

Initial value =

40

*y*

50

**The *y*-Intercept**

* Terra starts with $15 in her bank account and plans to save $5 per week.

**Total Saved ($)**

**Slide**

## Slope-Intercept Form

We will use the slope formula to write the slope-intercept form of a line.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | *y* |  |  |  |  |  |
|  |  |  |  |  |  |  |  | (*x,* | *y*) |  |  |
|  |  |  |  |  |  |  |  |  |  | ris | e = |
|  |  |  |  | **(0,** | ***b*)** |  |  |  |  |  |  |
|  |  |  |  |  |  |  | run | = *x* | − 0 |  |  |
|  |  |  |  |  |  |  |  |  |  |  | *x* |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |

*y* − *b*

Let ***m*** represent the **slope**.

(0, *b*) (*x*, *y*)

(0, *b*) and (*x*, *y*) are two points on the line.

rise

*m* 

run

 *x*  0

*m*  *y*  *b*

**4**



*x*

= *y* − *b mx* + *b* = *y*

**Slope-intercept form:** *y* = *mx* +

**Slide**

### REAL-WORLD CONNECTION

Jasper has $20 in his bank account. He deposits $8 per week.

Write a **linear equation** that finds how much money is in Jasper’s account after a certain number of weeks.

Initial =

(0, 20)

*m* =

(*x*, *y*)

8 *y*  20

8  *y*  20

*x*

8*x* = *y* − 20

**4**

*y* = + 20

8*x* + 20 = *y*

How much money will be in the account after 25 weeks?

* Let *x* = the number of weeks.
* Let *y* = the total $ in the bank account.

*y* = 8*x* + 20

*y* = 8( ) + 20

*y* = 200 + 20

*y* =

This means after 25 weeks, Jasper has $220 in the bank account.

**Slide**

If we have a plus sign, then *b* is positive. If we are subtracting *b*, then *b* is negative.

1



2

1

 2 

The *y*-intercept: *b* =

Ways to write the slope:

1

)

The slope: *m* =

1

*y*  2 *x*  (

-intercept.

2

*y*  1 *x*  8

***m*** represents the and is constant.

***b*** represents the

•

Given the following equation, **locate**

the slope and *y*-intercept of the line.

Change subtraction to adding a negative.

•

**Identifying the Slope and *y*-Intercept**

Slope-intercept form of a linear function:

***y* = *mx* + *b***

## Writing a Linear Equation

**8**

**10**

Slope-intercept form of a function:

***y* = *mx* + *b***

* *m* = slope
* *b* = *y*-intercept

Write the equation with the following characteristics:

* *Slope: m* = 3
* *y*-intercept: *b* = −1

*y* = + 2*b*

*y* = 3*x* + ( )

*y* = 3*x* − 1

**Slide**



*y* = *mx* + *b* −4

*y* = − 3

(0, −3)



2

Rise

−2

rise

*m*  run 

4

2

−2

−4

*x*

(2, 1)

Run

2

4

*y*

Slope-intercept form of a linear function:

***y* = *mx* + *b***

* ***m*** represents the slope and is constant.
* ***b*** represents the

*y*-intercept.

*b* =

**Identifying the Slope and *y*-Intercept to Write an Equation**

**13**

**15**

5. Test a point on your line in the equation to verify the equation.

points.

4. Draw a line that passes through

3. Use the slope, *m*, to locate a 2nd point.

).

2. Plot the *y*-intercept (0,

-intercept.

1. Determine the slope and

**The Graphing Process**

**PROCEDURE**

Given the slope-intercept form of a linear equation, you can graph the line.

**Slide**

## Graphing a Linear Equation

3

Graph a line given *y*   4 *x*  1 . *y* = *mx* + *b*

* 1. Determine the slope and y-intercept.

*m*  *b*  1

* 1. Plot the *y*-intercept (0, *b*). (0, )
  2. Use the slope, *m*, to locate a 2nd point.
  3. Draw a line that passes through both points.
  4. Verify the equation using another point. Choose the point (−4, 4):

*y*  3 ( )

# 4

 1  3  1  P

**15**



4

*y*

2

*x*

2

−2

Run

, −2)

(4

4

2

Fall

−

4

−

−4

How does knowing the slope and *y*-intercept help you graph and write the equation of a line?

**Lesson Question**

**Answer**

## Review: Key Concepts

Slope-intercept form: *y* = *mx* + *b*

1

*y*   3 *x*  2

* *y*-intercept = (0, )

**?**

**2**

 1

* slope =

Use the slope to locate a second point on the graph.

**Slide**

## Review: Key Concepts

Locate a third point on the line, (−3, 3). Verify that this point is on the line:

**2**



*y*  1 *x*  2 3

1

3  (3)  2  1  2 

3

4

3, 3)

(−

*y*

2

F

all

Run

−

4

−

2

2

4

*x*

−2

−4

*Use this space to write any questions or thoughts about this lesson.*