**?**

**W**

**2K**

**Words to Know**

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

functions.

of

**Compare** characteristics

**Determine**

and *y*-intercepts of linear functions.

**Analyze** linear functions expressed in different forms.

**Lesson Goals**

**Lesson Question**

|  |  |
| --- | --- |
|  | to find the place of something |
|  | the ratio of the change in the dependent values (outputs) to the change in the independent values (inputs) between two points on a line |
|  | the *y*-coordinate of the point where the graph of a line crosses the *y*-axis |
|  | a function that can be written in the form *y* = *mx* + *b*, where *m* and *b* are real numbers; consists of a set of ordered pairs all lying on the same line |


# Reviewing Ways to Represent a Linear Function

*y* (−2, 5)

|  |  |
| --- | --- |
| ***x*** | ***y*** |
| −2 | 5 |
| −1 | 2 |
| 0 | −1 |
| 1 | −4 |

*x y* = + *b*

***y*** = −**3*x*** + **17**

***y*** = **4*x*** − **0.15**

***y*** = −***x***

Graph Equations

**2**

**4**

**Comparing the Slopes**

Up or Down (sign of the slope)

•

slopes trend

upward: *y* increases as *x*

increases, left to right.

4

*x*

* Negative slopes trend

: *y* decreases as *x* increases, left to right.

*y*  2*x*

 4



*y*



−8

−4

8

4

4



8



8

*y*

**Slide**

**Linear Function Representations**

A linear function has a **slope** of  3 and a ***y*-intercept** of 2.

1

*m* 

2

*x*

*y* = *mx* +

**Equation**

**Graph**

−4

−2

4

2

2



4



4

*y*

***y***

|  |  |
| --- | --- |
| ***x*** | ***y*** |
| –1 | 213 |
| 0 | 2 |
| 1 | 123 |

**Slide**

 6

8 *y* 

*y*  4*x* 

4

8

4

4

8

* Slope close to zero means it is

to horizontal**.**

*x*

*y*

8

4

Steepness (absolute value of the slope)

* Larger slope means a

line (consider only the number, not the sign).

**24**

**7**

The is the function that has

the larger *y*-intercept.

* Which function has a larger *y*-intercept?

+ 4

*b* =

*y* =

*y* = *mx* + *b*

2 4

(0, 2)

2

4

4 2

form.

slope-

*x*

**Locate** the *y*-intercept of the linear function represented in the graph.

* **Locate** the *y*-intercept of the linear function represented in an equation written in

*y*

4

2

•

**Finding the *y*-Intercept**

**EXAMPLE**

**Slide**

# Representing Slopes of Linear Functions

## EXAMPLE

|  |  |
| --- | --- |
| ***x*** | ***y*** |
| −4 | −14 |
| −1 | −5 |
| 1 *x*1 | 1 *y*1 |
| 3 *x*2 | 7 *y*2 |
| 8 | 22 |

*y*

4

2

2

*x*

1



8



4

4

8

−2

1

2

*m*  *y*2  *y*1 

−4

 1 6

  3

*x*2  *x*1 3  2

**120**

* Find the slope of the linear function from data in the table.

*m* =

* Find the slope of the linear function expressed in the graph.

*m* 

* Compare the slopes.

Both are .

So, the slope of *m* = 3 is the function.

* Compare the two linear functions.

The function represented in the is positive and has a steeper slope than the function represented in the .

**Slide**

# Representing Intercepts of Linear Functions

## EXAMPLE

Compare the two linear functions.

*y*

4

2

|  |  |
| --- | --- |
| ***x*** | ***y*** |
| −4 | −14 |
| −1 | −5 |
| 1 *x*1 | 1 *y*1 |
| 3 *x*2 | 7 *y*2 |
| 8 | 22 |

*x*

−1)

(

−2



8



4

4

8

0,

−4

*m*  *y*2  *y*1

 7  1  

*x*2  *x*1

3  1

*2*

1 = 3(1) + *b*

1 = 3 + *b*

*b* =

**122**

* Find the *y*-intercept of the linear function from the data in the table.

*b* = .

* Find the *y*-intercept of the linear function expressed in the graph.

*b* = .

* Which function has a larger *y-*intercept?

Negative 1 is larger than negative 2, so the function has the larger *y*-intercept.

How can you determine the characteristics of linear functions that are represented in different ways?

**Lesson Question**

**Review: Key Concepts**

A linear function with the same slope and *y*-intercept can be in different ways.

A linear function has a slope of 2 and a *y*-intercept of −3.

*y* = 2*x* − 3

*m*

*y* =

+ *b*

2

*x*

*m*  2 

4

(0, 3)

**Words**

**Table**

**Equation**

**Graph**

−4

−2

4

2

2



4



 2

4

*y*

**?**

**2**

**Answer**

|  |  |
| --- | --- |
| ***x*** | ***y*** |
| −2 | −7 |
| 0 | −3 |
| 2 | 1 |

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