**?**

**W2K**

**Words to Know**

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

a real-world

situation.

*y*-intercept.

**Solv**.**e** real-world problems.

**Write** an

and for

**Find** the

**Lesson Goals**

**Lesson Question**

|  |  |
| --- | --- |
| input | a value that is transformed by a process and becomes |
| output | the of an input that has been transformed by a process |
| slope | the of the change in the dependent values(outputs) to the change in the independent values (inputs) between two points on a line |

**W2K**

**Words to Know**

change. The rate of change in a linear relationship is constant.

* The ***y*-intercept** represents the

value, or starting value.

of

* **Slope** represents the

O S I Y

**Output** is the number or value that results from the

of a given input into an expression or

function.

•

Slope-Intercept Form

*y* = *mx* + *b*

.

into an expression or

**Input and Output in the Real World**

* **Input** is the number or value substituted

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

**2**

*b* =

It represents the cost when you enter the taxi.

*m* =

It represents the cost for each mile traveled.

**Interpreting a Linear Function**

The cost of a taxi can be expressed by the linear function *y* = 1.75*x* + 3.

What does the slope represent? What does the *y*-intercept represent?

**Slide**

**Writing a Linear Function from a Table**

In the table below, *x* represents miles driven and *y* represents the cost to travel by taxi.

* Find the slope**.**

*m* 

*y*  *y*

2 1

*x*2  *x*1

 12  8

 4

*m* 

24  17

7

•

Find the *y*-intercept.

*y* = *mx* + *b*

17 = 1.75(8) + *b*

17 =

+ *b*

= *b*

* Write the equation in **slope-intercept form.**

*y* = *mx* + *b*

*y* =

|  |  |
| --- | --- |
| **Miles: *x***input | **Cost: *y***output |
| 2 | 6.50 |
| 5 | 11.75 |
| 8 *x*1 | 17 *y*1 |
| 12 *x*2 | 24 *y*2 |

**Slide**

### Finding the Slope and *Y*-Intercept of a Line

**EXAMPLE**

*y*

The graph shows the membership of a student group, where *x* represents the number of years since the group was formed and *y* represents the number of members.

20

1

60

1

**Number of Members**

Find the slope and *y*-intercept. 80

80)

(5,

*y*  *y*

*m*  2 1

)

38

*y*2

*x*2,

*x*2  *x*1

 80  38

5  2

42



40 (2,

*x*1,

*y*1

*x*

2

4

6

8

3



*y* = *mx* + *b*

38 = 14(2) + *b*

38 = + *b*

#### Years since Group Formed

**4**

= *b*

*y* = *mx* + *b*

*y* =

The slope is 14, and the *y*-intercept is 10.

**Slide**

### Interpreting a Linear Function

The membership of a student group is expressed by the equation

*y* = 14*x* + 10, where *x* represents the number of years since the group was formed and *y* represents the number of members.

* The *y*-intercept (when *x* = 0) shows that the initial

60

1

*y*

membership was .

**Number of Members**

* How many members did the group have after 4 years?

20

1

*y* = 14*x* + 10

80)

(5,

80

*y* = 14(4) + 10

)

38

(2,

40

*y* = + 10

*x*

*y* =

After 4 years, the group had 66 members.

#### Years since Group Formed

8

6

4

2

**6**

**Slide**

)

,

(

(4, 78.61)

List the ordered pairs based on the information in the problem.

What is the output?

*y* = the of the stock

since the stock purchase.

*x* = # of

**Input and Output in Real-World Relationships**

**EXAMPLE**

Justin bought a share of stock in a cell phone company. Four weeks after his purchase, the price for the share was $78.61. Fourteen weeks after his purchase, the price was $71.71.

What is the input?

**9**

**11**

in the stock price each week. It

What does the **slope** represent?

The slope represents the decreases $0.69 each week.

10

 6.9 

71.71  78.61

*m*  14  4

Find the **slope**.

*x*2  *x*1

*m* = *y*2  *y*1

**Finding the Slope in the Real World**

The relationship between the weeks Justin has owned a stock, *x*, and its price, *y*, is linear. Find the slope between the two points: (4, 78.61) and (14, 71.71). Use the formula to calculate slope:

**Slide**

price of the stock.

What does the *y*-intercept represent?

The *y-*intercept represents the

= *b*

+ *b*

78.61 =

**Finding the *Y*-Intercept in the Real World**

The relationship between the weeks Justin has owned a stock, *x*, and its price,

*y*, is linear. Use the slope, *m* = −0.69, and one of the points to find the *y*-intercept.

(4, 78.61) and (14, 71.71)

Find the *y*-intercept.

*y* = *mx* + *b*

78.61 = −0.69(4) + *b*

**11**

**13**

*y* =

The price of the stock after 10 weeks will be $74.47.

+ 81.37

*y* =

**Solving a Linear Function**

The price of the cell phone stock is expressed by the linear equation

*y* = − 0.69*x* + 81.37, where *x* represents the number of weeks Justin has owned the stock and *y* represents the price of the stock. If this relationship continues, what would be the price of the stock after 10 weeks?

*y* = −0.69*x* +

*y* = −0.69(10) + 81.37

# Summary

**Lesson Question**

**??**

How can you represent a real-world situation with a linear function?

**Lesson Question**

**Answer**

## Applying Linear Functions

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