

LESSON
12-3

Writing Equations from Tables

Reteach

The relationship between two variables in which one quantity depends on the other can be modeled by an equation. The equation expresses the dependent variable y in terms of the independent variable x .

x	0	1	2	3	4	5	6	7
y	4	5	6	7	8	9	10	?

To write an equation from a table of values, first compare the x - and y -values to find a pattern.

In each, the y -value is 4 more than the x -value.

Then use the pattern to write an equation expressing y in terms of x .

$$y = x + 4$$

You can use the equation to find the missing value in the table.

To find y when $x = 7$, substitute 7 in for x in the equation.

$$y = x + 4$$

$$y = 7 + 4$$

$$y = 11$$

So, y is **11** when x is 7.

Write an equation to express y in terms of x . Use your equation to find the missing value of y .

1.

x	1	2	3	4	5	6
y	3	6	9	12	15	?

2.

x	18	17	16	15	14	13
y	15	14	13	?	11	10

To solve a real-world problem, use a table of values and an equation.

When Todd is 8, Jane is 1. When Todd is 10, Jane will be 3. When Todd is 16, Jane will be 9. What is Jane's age when Todd is 45?

Todd, x	8	10	16	45
Jane, y	1	3	9	?

Jane is 7 years younger than Todd.

So $y = x - 7$. When $x = 45$, $y = 45 - 7$. So, $y = 38$.

Solve.

3. When a rectangle is 3 inches wide its length is 6 inches. When it is 4 inches wide its length will be 8 inches. When it is 9 inches wide its length will be 18 inches. Write and solve an equation to complete the table.

Width, x	3	4	9	20
Length, y	6			

When the rectangle is 20 inches wide, its length is _____.

LESSON
12-4

Representing Algebraic Relationships in Tables and Graphs
Reteach

The x - and y -values in an algebraic relationship should be related in the same way when new values of x or y are used. This pattern should be seen in a table of values and from a graph of the x and y values.

Example 1

What is the relationship of the x and y values in the table?

x	2	4	6	8	10
y	6	12	18	24	30

Solution

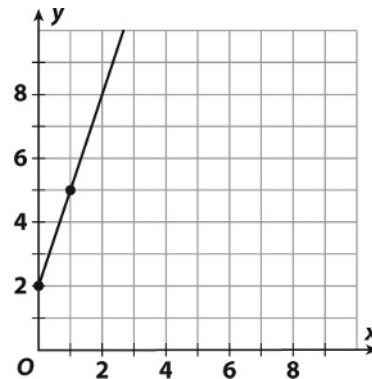
First, check to see if there is a simple addition, multiplication, division, or subtraction relationship between the x and y values.

Here, the y values are 3 times the x values.

This means that the algebraic relationship is $y = 3x$.

Example 2

What is the relationship between x and y represented by the graph.



Solution

First, notice that the line through the points crosses the y -axis at $y = 2$. This means that part of the relationship between x and y is given by $y = \underline{\hspace{1cm}} + 2$.

Next, notice that the line through the points goes over to the right by one unit as it “rises” by 3 units. This means that any x value is multiplied by 3 over 1 or 3 units as the line goes from one point to another. This is written as $y = 3x$.

Combine these two observations:
 $y = 3x$ and $y = 2$ give $y = 3x + 2$.
Both parts are needed to completely describe the relationship shown.

1. Find the relationship of x and y in the table.

x	0	1	3	6	7
y	1.5	2	3	4.5	5

$y = \underline{\hspace{1cm}} x + \underline{\hspace{1cm}}$

2. Find the relationship of x and y from a graph of a line that crosses the y -axis at $y = 6$ and that goes to the left 2 units and rises 3 units.

$y = \underline{\hspace{1cm}} x + \underline{\hspace{1cm}}$