

Algebra I
Lesson 4.3 – Writing Functions
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How much money should you charge for babysitting 3 hours? Is the amount of your paycheck corrected based on your pay rate \$6.00 per hour? Oh, that is simple you may be thinking to yourself, but what you may not know is that you are using a function rule, that is an equation to relate how much money you should get for working a certain amount of time.

Let's set up a table for number of hours worked and dollar amount you should get (\$6 per hour rate):

Time worked – x	0	1	2	3	4	5
Dollars earned – y	0	6	12			

What did we do to finish the table? Multiply the hourly rate by the number of hours worked? Or: $y = 6x$
Cool! We have an equation, a function to be more exact. What determines what in this equation? In other words which variable, the time worked or the dollars earned determines the end result?

Vocabulary:

Independent Variable – is the input of the function. The value of this variable determines what the answer or output of the equation will be. It is the deciding factor and it is generally the **x-variable**.

Dependent Variable – is the output or outcome of the function. The value of this variable depends upon the value of the *independent variable*. It is generally the **y-variable**.

Function notation – the dependent variable is a function of the independent variable. Spoken and written as:

$$y \text{ is a function of } x$$

$$y = f(x)$$

OK! So the number of hours worked is the deciding factor, therefore, the number of hours worked is the **independent variable**. The independent variable is the boss, it calls the shots. The boss says 3 hours, you get \$18.

Identify the independent and dependent variables in each situation. Write rule (equation) for each situation:

A painter must measure a room before deciding how much paint to buy.

The height of a candle decreases **d** centimeters for ever hour it burns.

A veterinarian must weigh an animal before determining the amount of medication to give.

An interior decorator charges \$85 per hour for her design services.

The cost to park at the water park is \$12.50 plus \$32.75 per person.

The trail mix Sarah buys is \$4.85 per pound.

Now that we know that the **y-variable** depends on the **x-variable**, if we are given a set of ordered pairs we can find a function equation that will model the x – y relationship. A simple functional relationship will either

1. have a number added to x: $y = x + \text{number}$
2. have a number multiplied by x: $y = (x)(\text{number})$
3. it can be a combination or even more complicated, but don't worry about that for now!



Let's look at a table of values and come up with an equation (function rule) that models the data.

x	1	2	3	4
y	6	7	8	9

$x + ? = y$ or $x \cdot (?) = y$
 $1 + ? = 6$ or $1 \cdot (?) = 6$
 $? = 5$ or $? = 6$
 $\therefore x + 5 = y$ or $x \cdot 6 = y$
(possible function equation)
Does this work for the other ordered pairs???

$(2, 7) \quad 7 = 2 + 5 \quad \checkmark$
 $(3, 8) \quad 8 = 3 + 5 \quad \checkmark$
 $(4, 9) \quad 9 = 4 + 5 \quad \checkmark$
 $y = x + 5$ answer

1. Look at the first ordered pair.
2. Figure out what number $\pm x$ will = y or times x will = y
3. Which equation form will give us a solution for the remaining x values?
After trying the \pm equation we find we have an equation rule that works.
If the \pm option does not work then look at \times
4. Figure out what number times x will = y
5. Can the same number be multiplied to the other x values to get the y values?

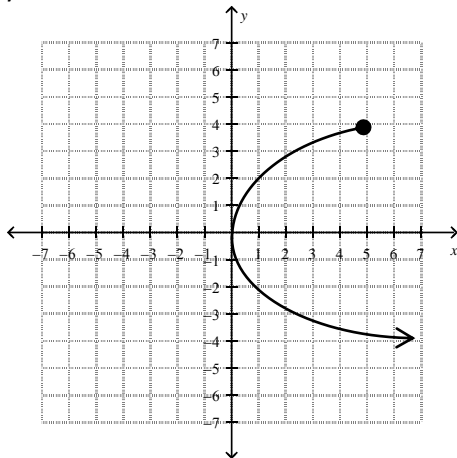
Determine a function equation for the following ordered pairs:

x	1	2	3	4
y	-3	-2	-1	0

$\{(1,9), (2,10), (3,11), (4,12)\}$

$\{(1,3), (2,6), (3,9), (4,12)\}$

Identify the domain and range, is it a function? Explain your answer.



Solve for x:

$$9x - 8 + 4x = 7x + 16$$