

## 5.4 Writing a Function Rule

Writing a function rule is as easy as finding a pattern.

Ask yourself, "What can I do to each  $x$  to get each  $y$ ?"

x	y
1	-1
2	0
3	1
4	2

$$y = x - 2$$

x	y
1	2
2	4
3	6
4	8

$$y = 2x$$

x	y
1	3
2	4
3	5
4	6

$$y = x + 2$$

Page 1

Sometimes it is hard to figure out if your table displays a linear or a quadratic function. Here's a tip to help you at least know what type of function to write.

If the first differences are all the same, it is a linear function. If the second differences are all the same, it is a quadratic function. At least then you will know what type of pattern to look for.

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You find a "difference" by subtracting. A first difference is when you only have to subtract once to get all the same differences. A second difference is when you have to repeat the process.

x	y	1st D
2	8	2
4	10	2
6	12	2
8	14	2

Linear  $\Rightarrow x$

$$y = x + 6$$

x	y	1st D	2nd D
1	1	3	2
2	4	5	2
3	9	7	2
4	16	17	

quadratic  $\Rightarrow x^2$

$$y = x^2 + 1$$

Once you know if you have a linear or a quadratic equation, it becomes easier to find a pattern.

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Function notation is a little confusing at first glance because you are used to parenthesis from the order of operations. However, the parenthesis in function notation are more like the parenthesis in English class. It's like saying, "Hey, by the way, use this variable or this number."

The first letter is the name of the function.  $f$  is the most common since it is the first letter of the word function, but others like  $C$  for cost,  $T$  for temperature,  $P$  for profit, are also common.

The parenthesis show the letter that is being used for the independent variable, or the value that is being plugged in for the independent variable.

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Try writing some names...

The exhibit is 20 times larger than normal. Find the length of an object in the exhibit

$E = \text{exhibit}$

$$E(n) = 20n$$

$n = \text{normal object}$

The newspaper makes \$25 per page of advertisement. Find the money they will make based on how many pages of advertisements they sell.

$M = \text{money}$   
 $p = \text{pages}$

$$M(p) = \$25p$$

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Suppose you buy a word-processing package for \$199. You charge \$15 per hour for creating word-processing documents for people. Write a rule to describe your profit as a function of the number of hours you work.

$P = \text{profit}$

$h = \text{hours}$

$$P(h) = \$15h - \$199$$

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A carpenter buys finishing nails by the pound. Each pound of nails costs \$1.19. Write a function rule to describe this relationship.

$M = \text{money}$

$p = \text{pounds of nails}$

$$M(p) = \$1.19p$$

How much do 12 pounds of finishing nails cost?

$$M(12) = \$1.19(12)$$

$$M(12) = \$14.28$$

$$\begin{array}{r} 1.20 \\ \times 12 \\ \hline 14.40 \\ - .12 \\ \hline \$14.28 \end{array}$$

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Page 756 in your textbook has several useful geometric formulas. If your homework asks for a function and you can't remember the geometric formula, this would be a good place to look. Your agenda may also have some formulas.

As you get more advanced in math, teachers and textbooks will expect you to remember everything you have learned before. If you don't have a perfect memory, you will have to get used to looking up previous information just like you may have to tonight in your homework.

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Homework  
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