

Creating Function Rules

When creating function rules, you need to think about the function machine. The function machine takes an input, does something to this input according to some rule, and returns a unique output.

Steps to Creating Function Rules:

Guided Example 1:

1. **Look at the x values.** You need to know if they are going up by one or if they are skipping.

2. **Next look at the y values.** How are they changing?

- Are they going up by the same amount?
- Are they going up by different amounts?

The y values in this table are going up one every time. That means the you will multiply each "x" by one.

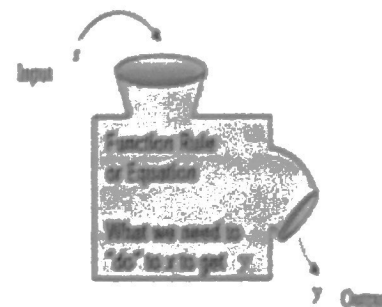
3. **Go back to the first x. (Self-check with second x).**

- Looking at the first x, after you multiply it by one, what do you need to do to make it equal the y value? $1x = 1(1) = 1 + 4 = 5$
- Looking at the second x, after you multiply it by one, what do you need to do to make it equal the y value? $1x = 1(2) = 2 + 4 = 6$

You need to add 4. This means the rule is $y = 1(x) + 4$.

4. **Once you decide on a rule, make sure it works for the other x values.** The function is $y = 1x + 4$.

In function notation, it is $f(x) = x + 4$.



Example 1:

x	y
1	5
2	6
3	7
4	8

Guided Example 2:

1. **Look at the x values.** You need to know if they are going up by one or if they are skipping.

2. **Next look at the y values.** How are they changing?

The y values in this table are going up 5 every time. That means the you will multiply each "x" by 5.

3. **Go back to the first x. (Self-check with second x).**

- Looking at the first x, after you multiply it by five, what do you need to do to make it equal the y value? $5x = 5(-2) = -10 + 3 = -7$
- Looking at the second x, after you multiply it by one, what do you need to do to make it equal the y value? $5x = 5(-1) = -5 + 3 = -2$

You need to add 3. This means the rule is $y = 5(x) + 3$.

4. **Once you decide on a rule, make sure it works for the other x values.** The function is $y = 5x + 3$.

In function notation, it is $f(x) = 5x + 3$.

Example 2:

X	Y
-2	-7
-1	-2
0	3
1	8

Practice. Create a function rule for the table and points below.

A.

x	1	2	3	4
y	-1	0	1	2

+1 +1 +1

$1x - 2$
OR
 $x - 2$

B. ((1, 3), (2, 6), (3, 9), (4, 12))

x	1	2	3	4
y	3	6	9	12

+3 +3 +3

$3x + 0$
OR
 $3x$

$1x = 1(1) = 1 - 2 = -1$
 $1x = 1(2) = 2 - 2 = 0$
 $1x = 1(3) = 3 - 2 = 1$

$3x = 3(1) = 3 + 0 = 3$
 $3x = 3(2) = 6 + 0 = 6$
 $3x = 3(3) = 9 + 0 = 9$

Creating Function Rules from a Context

Scenario: Consider the following situations...

- The number of hours worked and the money earned
- Your grade on a test and the number of hours you studied
- The total cost of a pizza delivery and the number of pizzas ordered

There are two quantities changing in each situation: Independent and Dependent Quantities/Variables:

Independent Quantities/Variables	Dependent Quantities/Variables
Input values (x)	Output values (y) - <i>end result/total</i>
NOT changed by other quantities/quantity that dependent quantity depends on	Changes due to independent quantity/DEPENDS on independent quantity
Located on x-axis	Located on y-axis

In the scenarios listed above, circle the independent quantity and underline the dependent quantity. Then name a variable to represent the independent and dependent quantities.

Creating functions is very similar to creating equations. You will want to define a variable, identify the changing value(dependent), and the constant value(independent).

Scenario: An art teacher has \$500 for supplies and plans to spend \$25 per week.

A. Name the independent and dependent quantities.

B. Create a function rule relating the two quantities.

- (x) independent: number of hours
 (y) dependent: total spent on supplies

$y = -25x + 500$
 $f(x) = -25x + 500$

C. How much money will be remaining after 4 weeks? (x)

D. After 6 weeks? (x)

$f(4) = -25(4) + 500$
 $f(4) = -100 + 500$
 $f(4) = \$400$ remaining

$f(6) = -25(6) + 500$
 $f(6) = -150 + 500$
 $f(6) = \$350$ remaining

F. How many weeks did it take to have \$100 remaining? (y)

G. How long did it take to spend all the money? - \$0 Rem.

$y = -25x + 500$
 $100 = -25x + 500$
 $-500 \quad -500$

 $-400 = -25x$
 $16 = x$
 weeks

$0 = -25x + 500$
 $-500 = -25x$
 $-25 \quad -25$

 $20 \text{ weeks} = x$