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# Finding the Rule

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# What is a Rule?

The rule is an equation which enables us to mathematically relate the variables in any given situation.

There are two types of situations that we will be looking at today:

- 1- When given the rule, complete the table of values
  - 2 - Given a table of values, find the rule
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# Example 1

Let's start off easy

Given the rule below, complete the following table of values:

$$y = 2x$$

x	y

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## Example 2

Given the rule below, complete the following table of values:

$$y = -3x + 1$$

x	y

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# Finding the Rule

Every time that we are given a rule of a function or looking for the rule of a function, the rule is always in the form:

$$y = mx + b$$

This rule relates variables  $x$  and  $y$

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# Finding the Rule

The letter  $m$  in the equation is called the rate. The rate tells us how the  $y$ -values change in relation to how the  $x$ -values change.

For example, what do we notice in the following table?

$x$	$y$
-1	-5
0	-3
1	-1
2	1

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# Finding the Rate (m)

To find m, we use the equation:

$$\text{Rate} = m = \frac{\Delta y}{\Delta x}$$

Where,  $\Delta y$  is the change in the y-values

and

$\Delta x$  is the change in the x - values

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# Finding the Rate

So, let's go back and look at our table:

x	y
-1	-5
0	-3
1	-1
2	1

$$\Delta x =$$

$$\Delta y =$$

$$\text{Rate} = m = \frac{\Delta y}{\Delta x}$$

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# Initial Value (b)

The letter  $b$  in the equation  $y = mx + b$  is called the initial value.

The initial value is the value of “ $y$ ” when  $x = 0$

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# Initial Value (b)

So, for our table of values:

x	y
-1	-5
0	-3
1	-1
2	1

Initial value =  $b =$

Rule:  $y = mx + b$

$y =$

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## Example 3

Given the following table of values, find the rule that represents the situation below:

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

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## Example 4

Given the following table of values, find the rule that represents the situation below:

x	y
-3	-1
0	0
3	1
6	2

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