## 1.6: Represent Functions as Rules and Tables

Goals: *Identify whether a pairing as a function
*Identify domain and range of a function
*Identify dependent and independent variables
*Make tables for functions
*Write rules for functions

Function: a relationship between _2 $\qquad$ variables called $\qquad$ input $\qquad$ and
$\qquad$ output $\qquad$ .
$\qquad$ ONE $\qquad$ OUTPUT $\qquad$ !!

Domain: the set of all __input $\qquad$ values

Range: the set of all $\qquad$ output $\qquad$ values

Ex: Tell whether each pairing is a function. If yes, state the domain and range. If no, say why.


No, 0 has two outputs
C)

| Input | Output |
| :---: | :---: |
| 3 | 1 |
| 6 | 2 |
| 9 | 2 |
| 12 | 1 |


| Input | Output |
| :---: | :---: |
| 0 | 0 |
| 1 | 2 |
| 4 | 8 |
| 6 | 12 |

Yes, each input has 1 output
Domain: 0, 1, 4, 6
Range: 0, 2, 8, 12
D)

| Input | 2 | 2 | 4 | 7 |
| :---: | :---: | :---: | :---: | :---: |
| Output | 0 | 1 | 2 | 3 |

Yes, each input has one output
Domain: 3, 6, 9, 12
Range: 1,2
*You can represent a function in 3 ways:
a) Verbal Rule
b) Equation
c) Table
"The output is 3 more than the input" $y=3+x$

| $\boldsymbol{x}$ | 0 | 1 | 2 | 3 |
| :--- | :--- | :--- | :--- | :--- |
| $\boldsymbol{y}$ | 3 | 4 | 5 | 6 |

For the following functions, make a table and identify the range.
Ex: Function is $y=2 x$ with a domain of $0,2,5,7,8$

| $\boldsymbol{x}$ | 0 | 2 | 5 | 7 | 8 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\boldsymbol{y}$ | 0 | 4 | 10 | 14 | 16 |

Range: 0, 4, 10, 14, 16

Ex: Function is $y=x-5$ with a domain of $10,12,15,18,29$

| $\boldsymbol{x}$ | 10 | 12 | 15 | 18 | 29 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\boldsymbol{y}$ | 5 | 7 | 10 | 13 | 24 |

Range: 5, 7, 10, 13, 24

## To write a rule for a function:

1. Start with $\qquad$ $=$ $\qquad$
2. Find out what is happening to $\qquad$ to get $\qquad$ $y$ $\qquad$
3. Check that it works for all $\qquad$ inputs $\qquad$ !

## Write a rule for each function.

Ex:

| Input (x) | 0 | 1 | 4 | 6 | 10 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Output (y) | 2 | 3 | 6 | 8 | 12 |

$$
y=x+2
$$

Ex:

| Input | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{4}$ | $\mathbf{7}$ | $\mathbf{9}$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Output | $\mathbf{0}$ | $\mathbf{1}$ | $\mathbf{3}$ | $\mathbf{6}$ | $\mathbf{8}$ |

$y=x-1$

Ex:

| Time (hrs) | 1 | 2 | 3 | 4 |
| :--- | :--- | :--- | :--- | :--- |
| Pay (\$) | 8 | 16 | 24 | 32 |

$$
y=8 x
$$

Writing a rule for a function: (*don't forget all functions start with: $\qquad$ $y=$ $\qquad$
$\Delta$ is the Greek letter $\qquad$ Delta $\qquad$ . In math, it means $\qquad$ change $\qquad$ in__

Ex: $\Delta T$ would mean to find:
If it was $59^{\circ}$ this morning and it is $65^{\circ}$ now, what is $\Delta \mathrm{T} ? \quad \Delta \mathrm{~T}=6^{\circ}$

1. Find $\Delta x$ "how much does $\qquad$ $x$ change by each time?"
2. Find $\Delta y$ "how much does $\qquad$ change by each time?"

## 3. Set up a fraction: $\frac{\Delta y}{\Delta x}$ Simplify if possible. DO NOT MAKE A DECIMAL!

4. This number (the one you get from the fraction) becomes the __coefficient___ of $x$ in your function. (This mean it
$\qquad$ multiplies $\qquad$ x)
5. Check to see if your function works by putting in __inputs $\qquad$ and seeing if you get the correct $\qquad$ output $\qquad$ . If not, adjust your function by adding or subtracting.

Write a rule for each function, using the steps provided.

Ex:

| $\boldsymbol{x}$ | $\boldsymbol{y}$ |
| :---: | :---: |
| 0 | 1 |
| 2 | 5 |
| 4 | 9 |
| 6 | 13 |

$$
\Delta x=2 \quad \Delta y=4
$$

$\frac{4}{2}=2$ so in your function, 2 will be the coefficient (multiplier of $x$ )
$y=2 x$ If you put in the first input of 0 , you would get out a 0 , but you want a
1 , so adjust your function by adding 1 . Then check for all other inputs.

$$
y=2 x+1
$$

Ex:

| $\boldsymbol{x}$ | 1 | 4 | 7 | 10 |
| :---: | :---: | :---: | :---: | :---: |
| $\boldsymbol{y}$ | 1 | 10 | 19 | 28 |

$$
y=3 x-2
$$

