Created by Ms. Niemec

Warmup $9/\left(\frac{4!}{4}+2\sqrt{4}\right)$ This is Week 6!!!

Try to figure out the rules. Write each rule in the form "Output = Input + 3" or something similar.

1)

Input	Output
9	-9
5	-13
32	14
-6	-24
99	81

Output = Input – 18

2)

Input	Output
6	10
0	-2
13	24
30	58
6	10

Output = Input•2 – 2

3)

Input	Output
2	13
5	25
6	29
7	33
100	405

Output = Input•4 + 5

4)

Input	Output
5	15
7	39
-7	39
10	90
3	-1

Output = $\text{Input}^2 - 10$

5) The exclamation point in Ms. Niemec's problem above is actually a mathematical symbol. Based on the fact that today is the 10th, can you figure out what 4! should be equal to? (And is there anyone who actually knows what the ! sign does?)

Bonus knowledge!

- ! = "factorial"
- "5!" is "5 factorial"
- It means to multiply $5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$.
- What is the value of 5 factorial?
- Factorials get huge very quickly:
- $10! = 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$
- 10! = 3,628,800

Go over Graphing Stories WS

Unit 1 QUIZ

- The deadline to retake is Wednesday!
- Your corrections/extra practice is due TOMORROW!
- If you are retaking the quiz on the day of the deadline, you must be done by the end of lunch. This means you probably need to start at the beginning of PLT.

Table of Contents

YOU DO NOT NEED TO LABEL A NEW NOTES PAGE. THIS WILL BE A HANDOUT!!!

5

What is a Function?

Objectives:

-Introduce yourself to the VERY important math concept of a "function"

-Decide if a table, graph, or situation is or is not a function

A couple more "guess my rules…"

- Raise your hand if you know the rule!

Play "Guess My Rule" in pairs

- Let me know if you have nobody to join with!
- Take turns thinking of rules. You may make the rule whatever you want, but you may not use a calculator!!!

Would this be a fair rule?

Input	Output
9	45
5	31
1	7
-4	-18
5	27

Would this be a fair rule?

Input	Output
10	45
7	19.5
3	-0.5
6	13
10	45
-6	19

Would this be a fair rule?

Input	Output
1	-6
2	-3
3	2
5	18
7	42
10	93

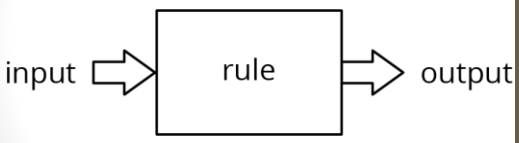
Would this be a fair rule?

Input	Output
5	13
2	13
97	13
-3.2	13
0	13

Vocab

THIS SENTENCE IS REEEEEEEEEEALLY IMPORTANT!

- **A function is a rule. Each input must only have one output.**



- **(It has to be "fair"!!!)**

Rest of today:

- We will simply be asking the question "Is this a function???"
- We will do more practice later with trying to figure out what the rule is. But for now, **all we care about is if the rule is FAIR or not**.

Function?

x	y
3	6
5	10
5	12
8	14
12	18

No; the input "5" has more than one output.

Function?

x	y
-8	16
10	-20
1	-2
4	-8
1	-2

Yes; there is a repeated input, but the output is the same.

Function?

x	y
1	5
1	6
2	7
2	8
3	9

No; the inputs "1" and "2" have more than one output.

Function?

x	y
1	24
2	9
3	-6
4	-21
5	-36

Yes; each input has only one output.

Function?

x	y
1	-2
2	-2
3	-2
4	-2
5	-2

Yes; each input has only one output. (You can have the same output for multiple inputs!)

Function?

(2, 8); (-5, 9); (7, 9); (2, -4), (7, 4)

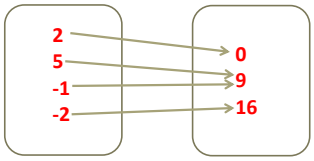
No; the input "2" has more than one output.

Function?

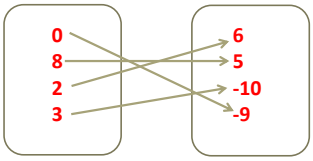
(1, 5); (8, 19); (4, 11); (-8, -13), (1, 5)

Yes, each input has only 1 output.

- **Mapping Diagram:**
- Express the relation **(2,0), (5, 9), (-1, 9), (-2, 16)** as a mapping diagram.

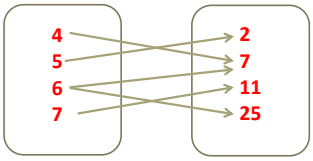


Function?



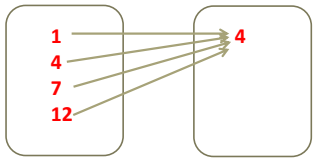
Yes, each input has only 1 output.

Function?



No; the input "6" has more than one output.

Function?



Yes, each input has only 1 output.

IS IT A FUNCTION?

One input → Multiple outputs = BAD

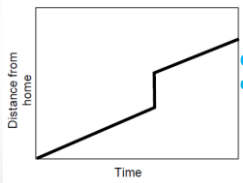
Multiple inputs → one output = OK

(There are several types of mathematical rules that can give you repeated outputs. For example, multiplying by zero then adding anything. Squaring a number. Taking the absolute value. And many, many more!)

Let's look at some graphs now…

8 This graph is just plain wrong. How can Tom be in two places at once?

H

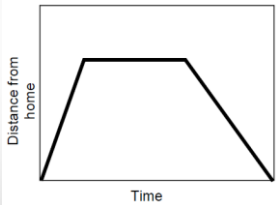


Input = time, Output = distance from home

One time → 2 different locations: does not make sense!!!

1 Tom ran from his home to the bus stop and waited. He realized that he had missed the bus so he walked home.

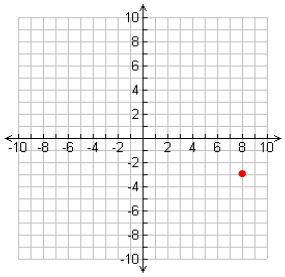
G



Input = time, Output = distance from home

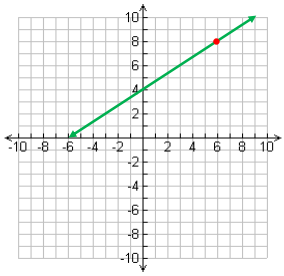
2 different times → same location: does make sense!

What is the input and output of this point?



Input = 8
Output = -3

If the input is 6, what's the output?

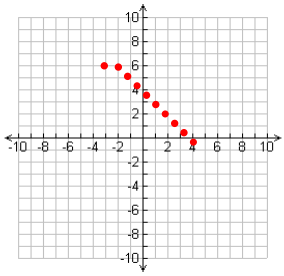


Output = 8

On a graph…

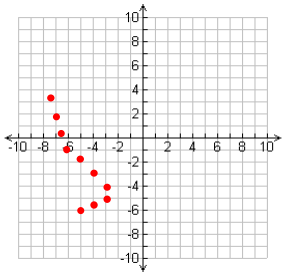
- **"x" is the input, and "y" is the output.**

Function?



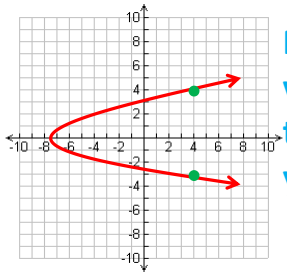
Yes

Function?



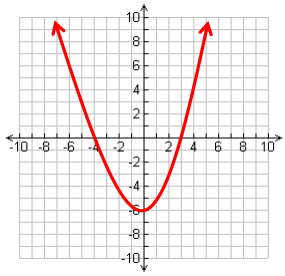
No

Function?



No; most x-values have two different y-values

Function?

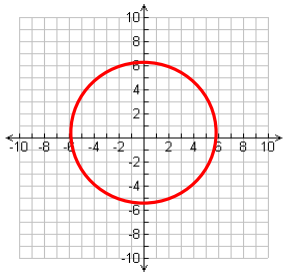


Yes; every x-value has only one y-value

Rules for graphs of functions

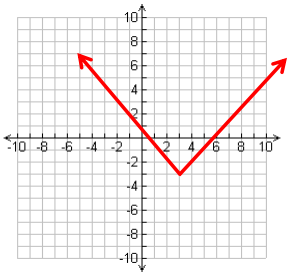
- **ON A GRAPH:**
  - **The x-value (horizontal) is the INPUT and the y-value (vertical) is the OUTPUT.**
  - **To be a function, each x-value can only have one y-value.**

Function?



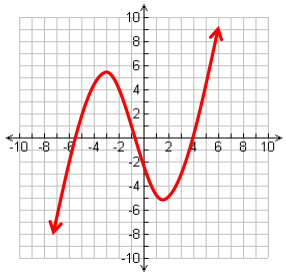
No

Function?



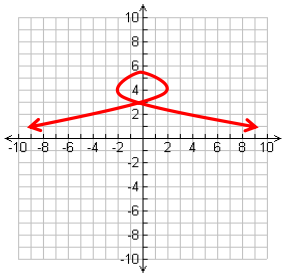
Yes

Function?



Yes

Function?



No