## Warmup 9/ (Area of a square with a side length of 3 )

For 1 \& 2, select the correct graph and explain why you chose it.

1) A man takes a ride on a ferris wheel.

d)


A train pulls into a station and lets off its passengers.
2)
a)
b)

c)

d)

3) Draw a graph with an $x$-axis of "time" and a $y$-axis of "distance traveled" that would be impossible - that is, where Tom would be in 2 places at once.

## Go over Graphing Stories WS

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

## 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

## Game: Guess My Rule

## Would this be a fair rule?

Input
9
5
1
-4
5
27

## Would this be a fair rule?

Input
10
Output
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
5
2
97
-3.2
0

Output
13
13
13
13
13

## Vocab

 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 $\rightarrow$ Multiple outputs $=$ BAD

## Multiple inputs $\rightarrow$ 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?


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


2 different times $\rightarrow$ same location: does make sense!

Time

## 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.

