

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

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

1)

Input	Output
9	-9
70	52
32	14
-6	-24
99	81

Output = Input - 18

2)

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

Output = Input • 4 + 5

3)

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

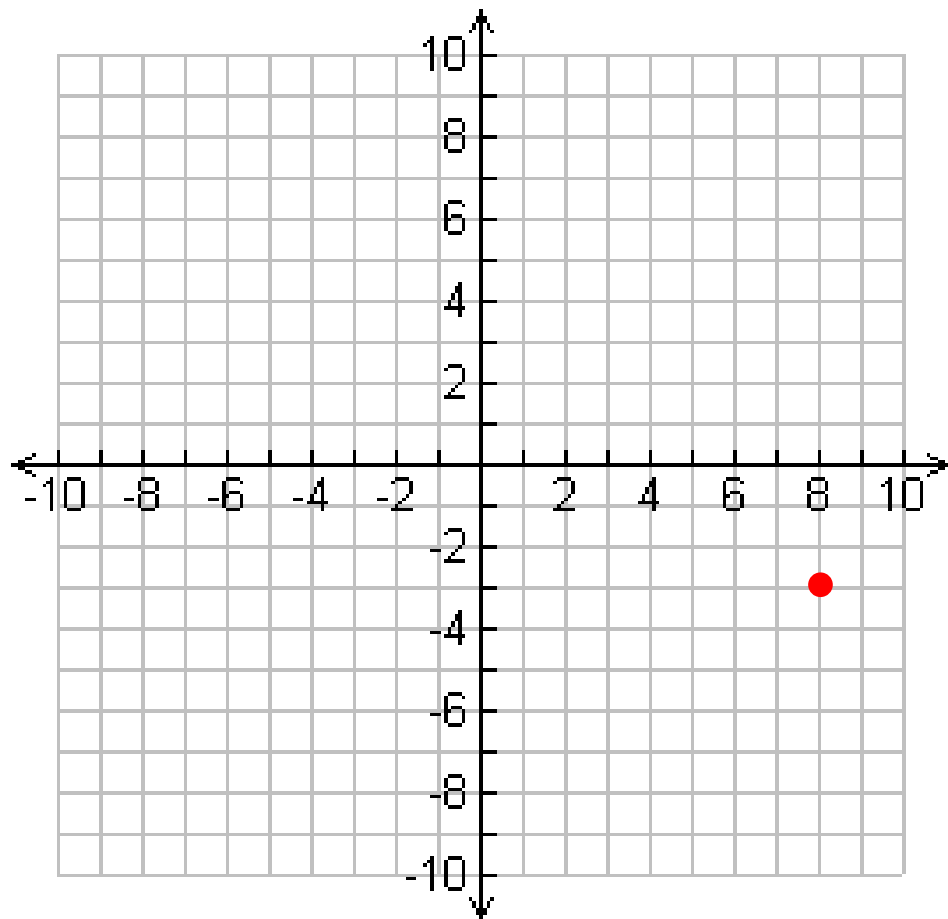
Output = Input² - 10

4) 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:**
- **$10! = 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$**
- **$10! = 3,628,800$**

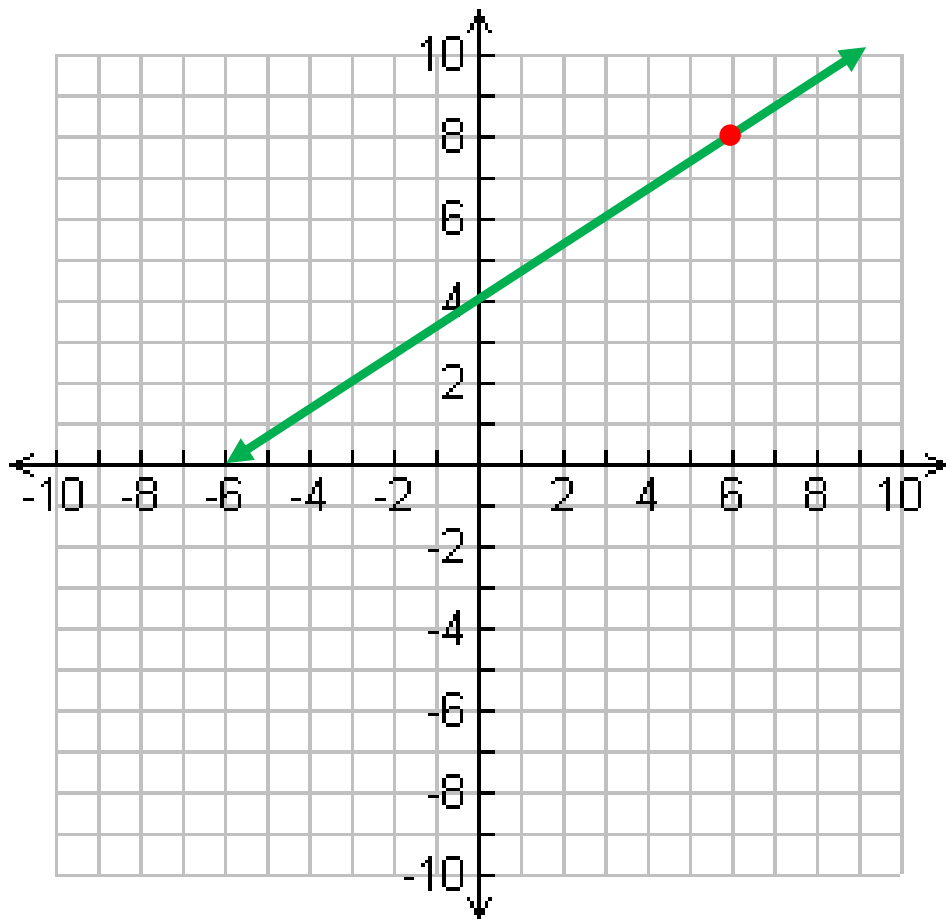
What is the input and output of this point?



Input = 8

Output = -3

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

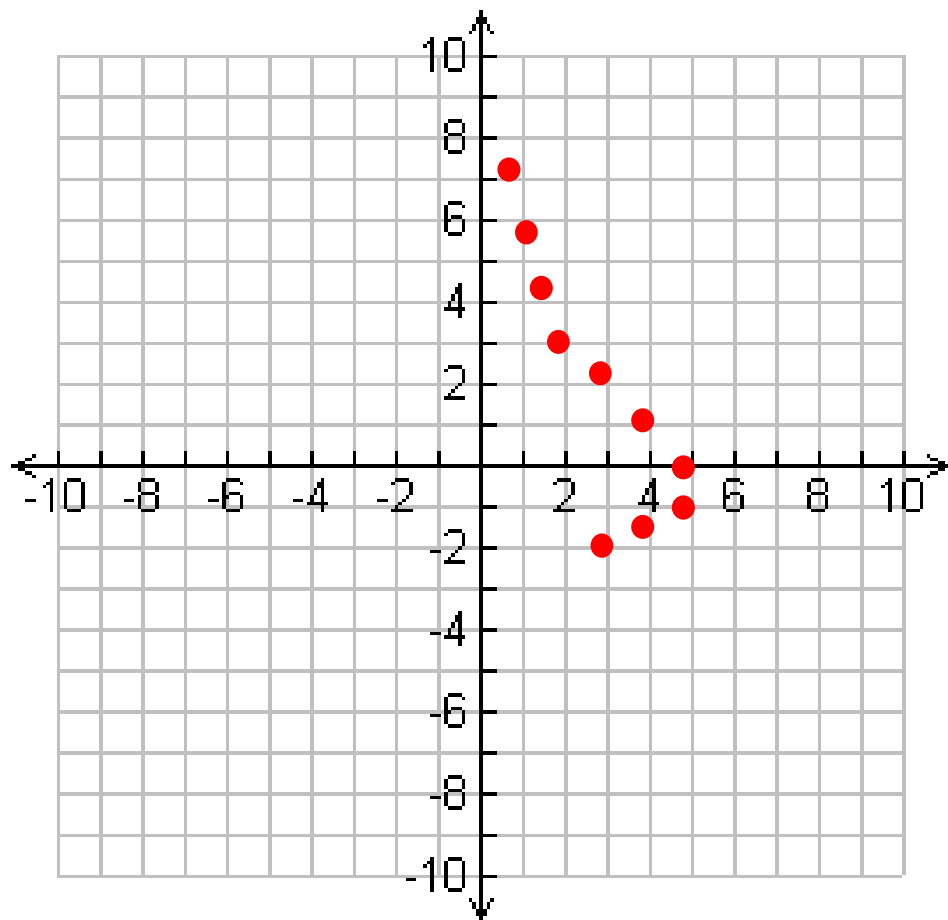


Output = 8

On a graph...

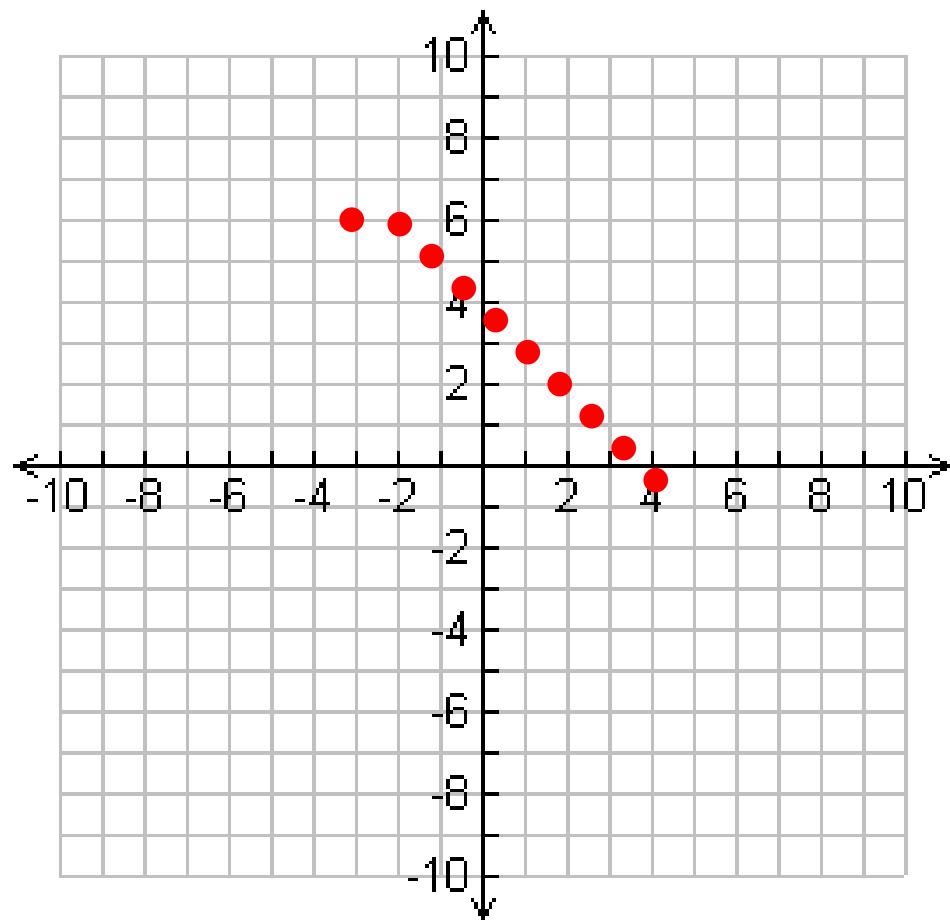
- **“x” is the input, and “y” is the output.**

Function?



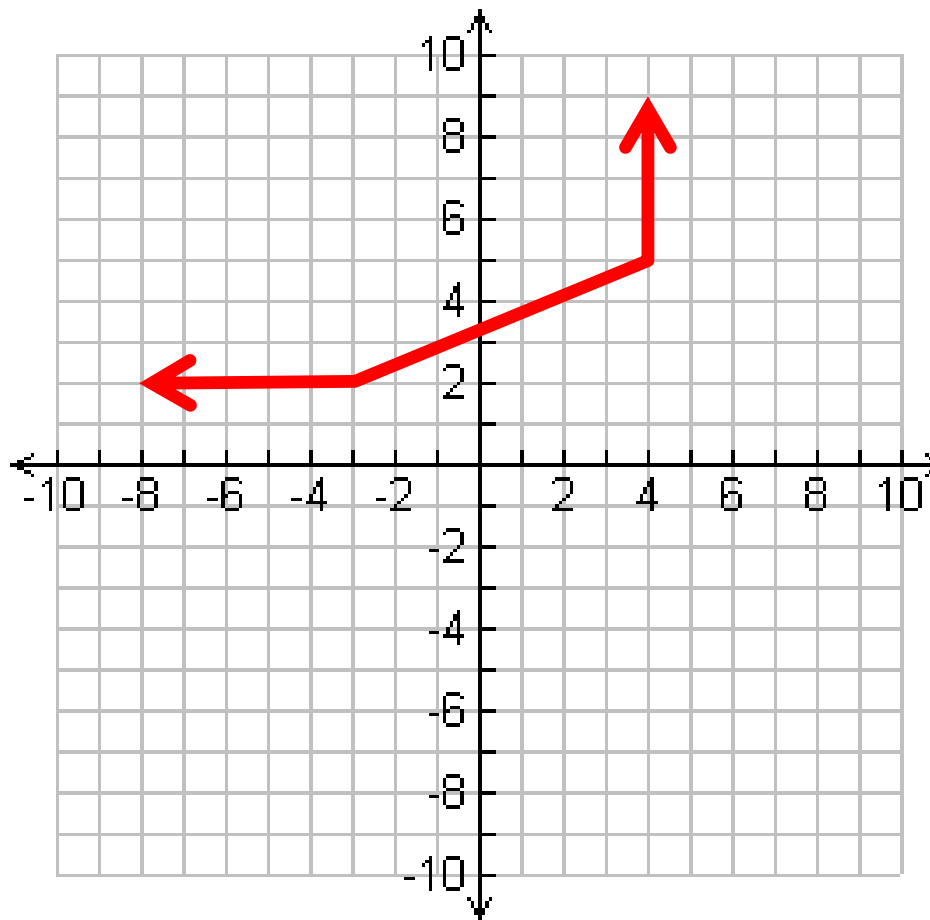
No

Function?



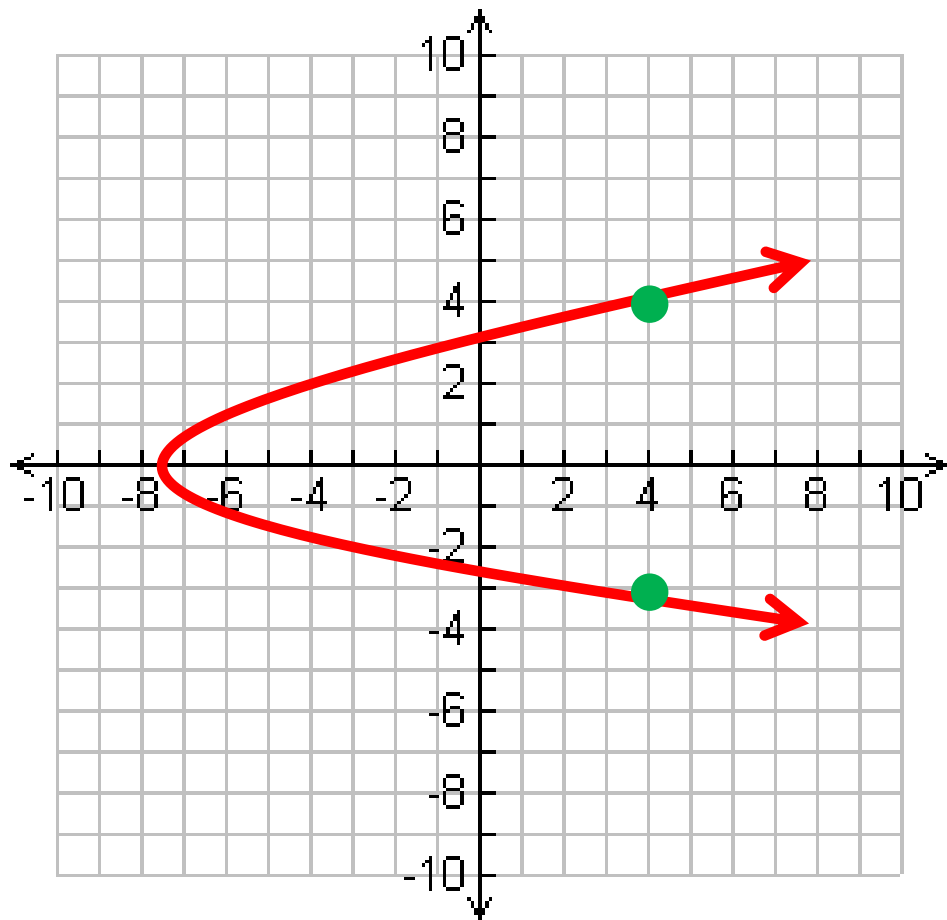
Yes

Function?



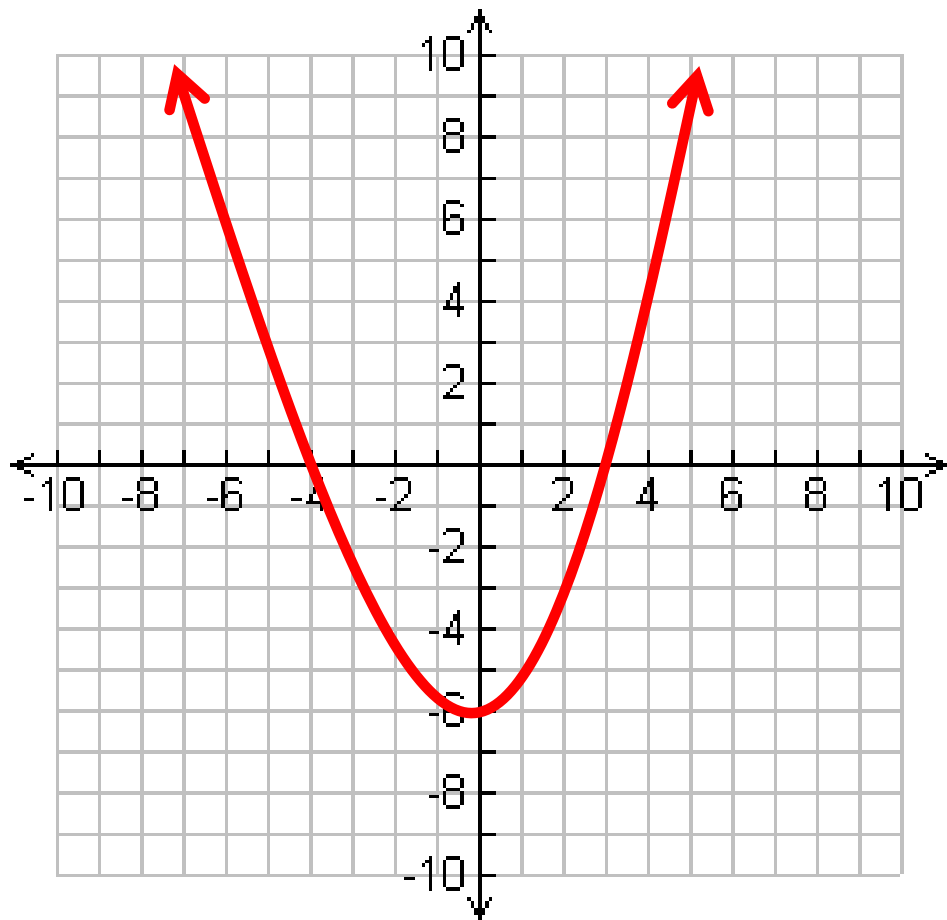
**No; the input
of “4” has
multiple
outputs**

Function?



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

Function?

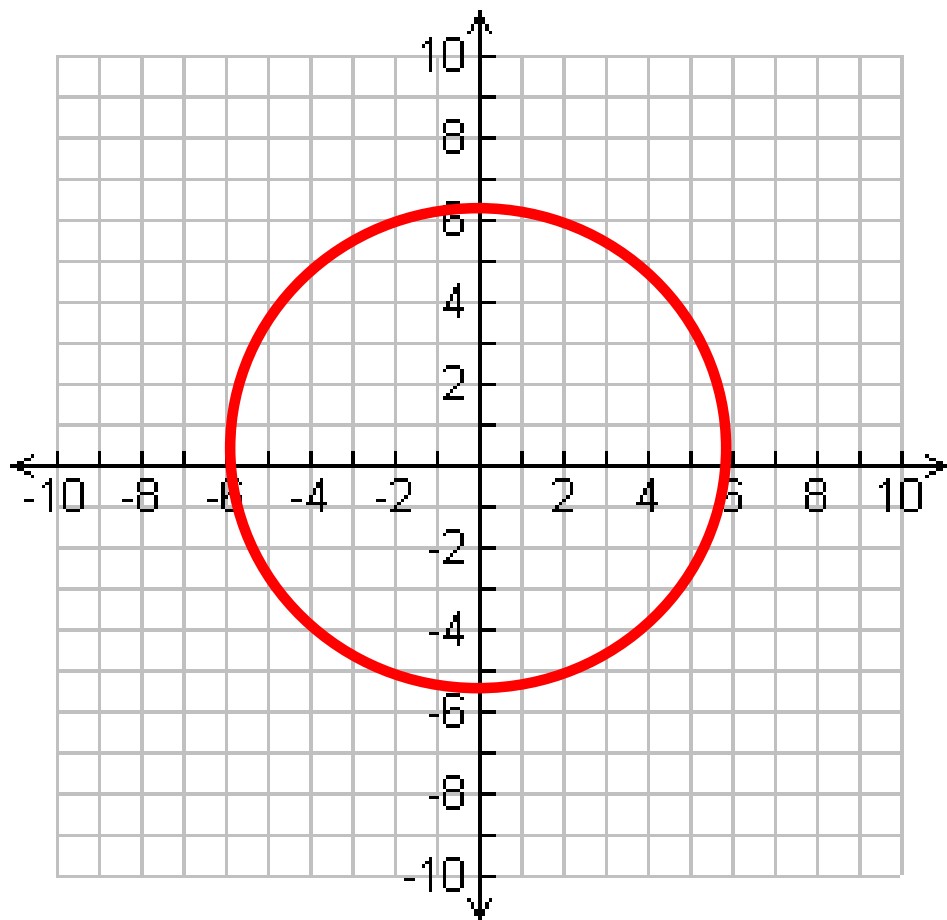


Yes; every x-value has only one y-value

Rules for graphs of functions

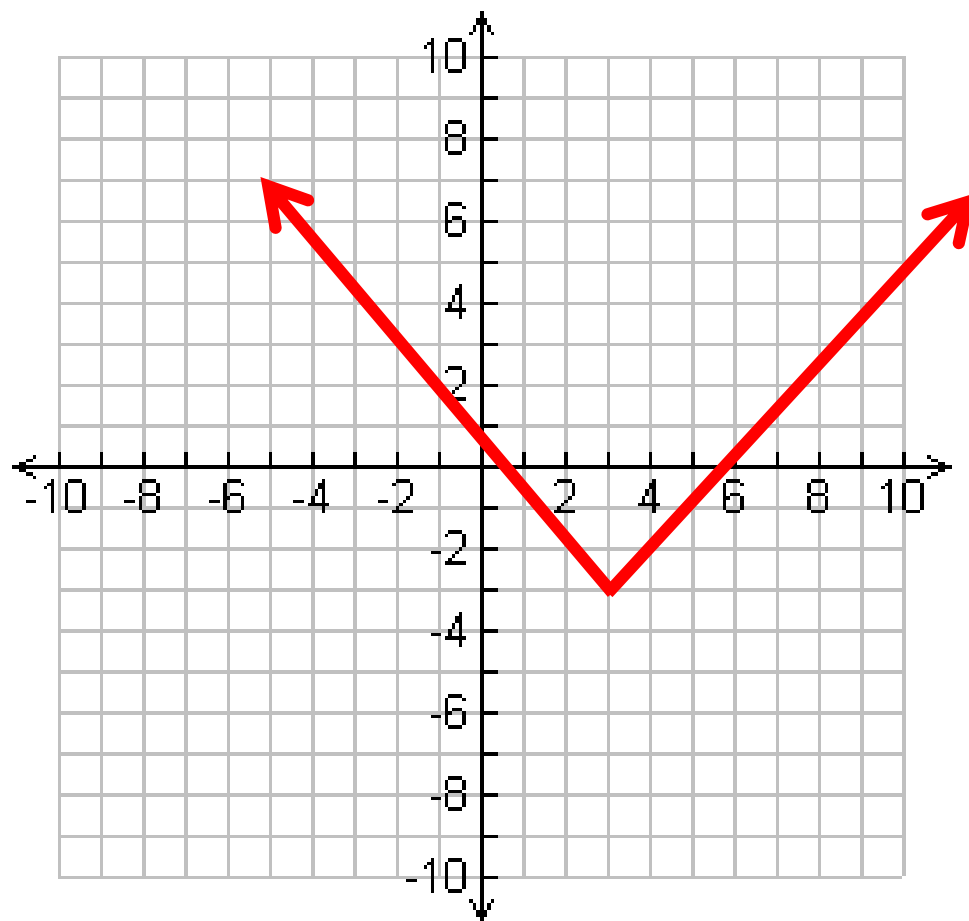
- ON A GRAPH:
 - The x-value (horizontal) is the INPUT and the y-value (vertical) is the OUTPUT.
 - To be a function, each x-value can only have one y-value.

Function?



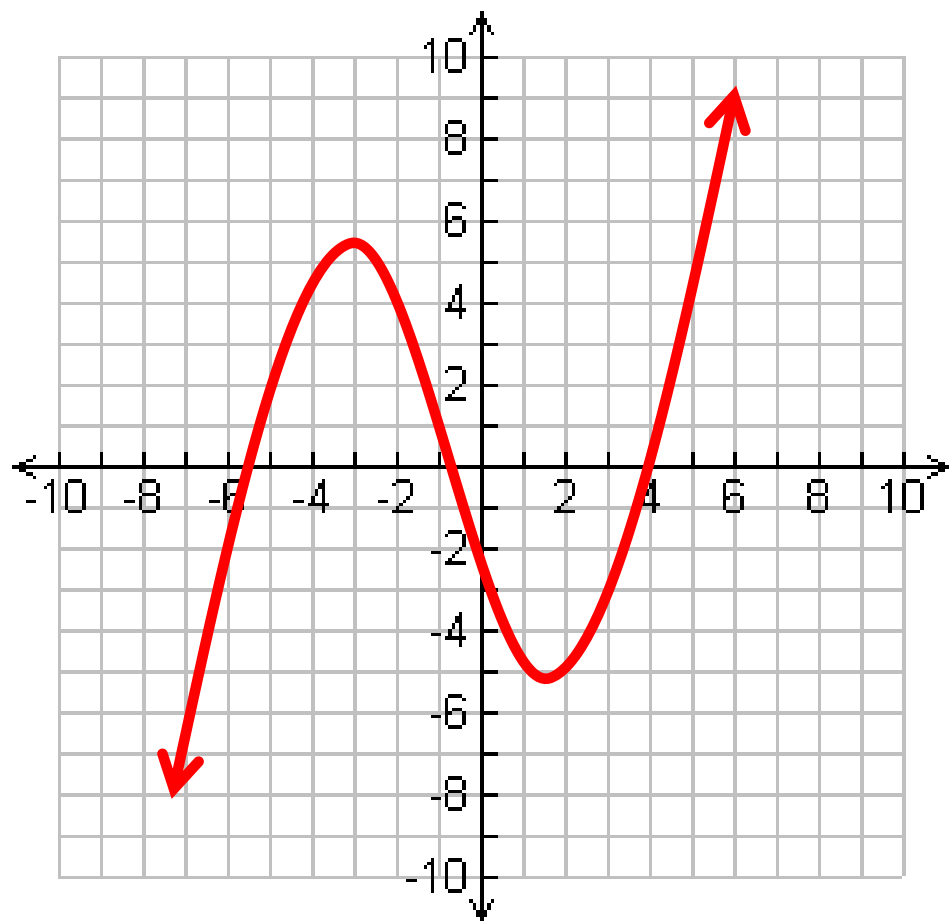
No

Function?



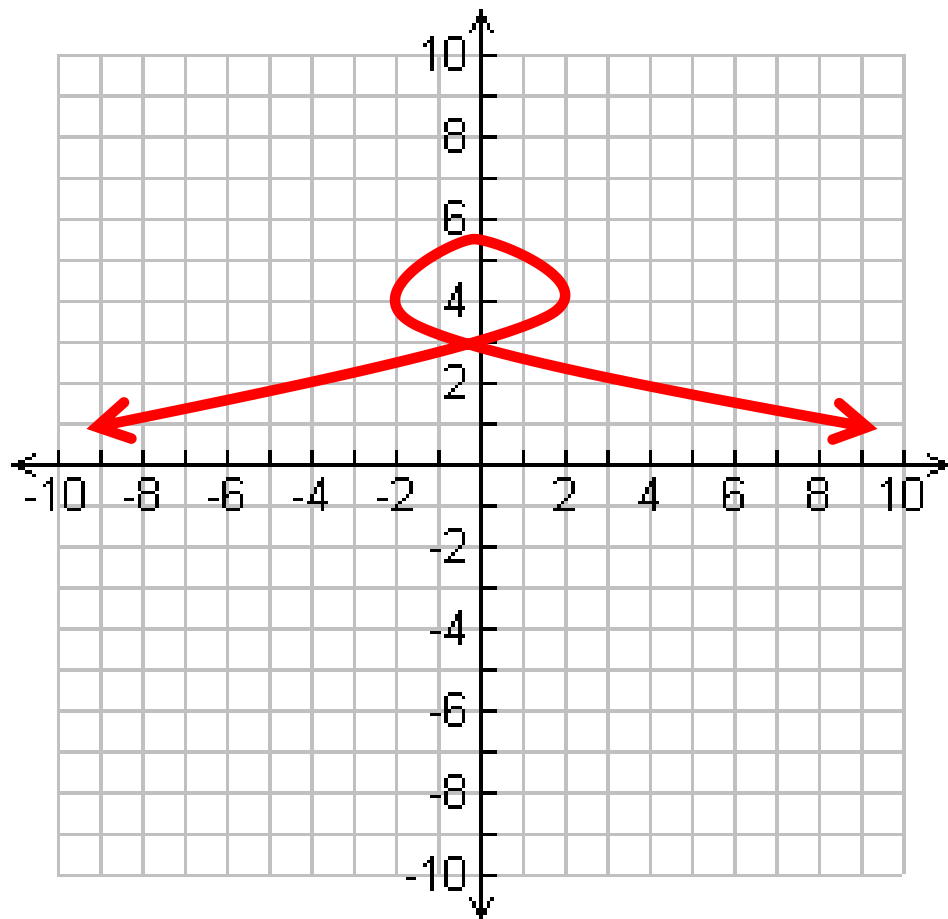
Yes

Function?



Yes

Function?



No

Would this be a function?

- Input = student in this class
- Output = desk label of the student's assigned seat

**Yes, each student only has
one assigned seat**

Would this be a function?

- Input = letter of the alphabet
- Output = word that begins with that letter

No; a letter could have multiple words that begin with it

WITH YOUR GROUP:

- Decide whether each of the relationships are functions. EACH PERSON should be able to explain each one, so discuss well!!!

1. **Input = Instagram account, Output = password**
2. **Input = password, Output = Instagram account**
3. **Input = student, Output = the student's current hair color**
4. **Input = student in our class, Output = planet he/she lives on**
5. **Input = state, Output = # of letters in the state's name**
6. **Input = state, Output = a letter in the state's name**
7. **Input = month, Output = # of days in the month**
8. **Input = # of days in the month, Output = month**
9. **Input = date, Output = temperature outside**
10. **Input = any integer, Output = double that integer**

1, 4, 5, 10 are functions

Please complete #4 – 9 on the homework

- We will check it in just a couple minutes!