Functions:

Today's goal:

understand how to identify a function vs. a non-function

*Why is it important to learn about functions?

*What do you know about them? What would you like to learn about them?!

Sep 14-8:28 AM

Name: _____ Date: _____ Unit 3 Class Work

Why Are Functions Important to Learn About?!

- basis of almost all mathematics
- useful in engineering, science, technology, etc.
- real world depends on them

Short-Term Goals/Objectives:

- identify functions
- create functions
- understand domain & range

Thoughts/Questions About Functions

- more about function tables
  ex: input | output
  → equations, contextual situations, graphs
- many types

Name: _____ Date: _____ Unit 3 Class Work

Why Are Functions Important to Learn About?!

- how everything works
- useful & necessary in math, engineering, technology, accounting, finance... (basis of most math)

Thoughts/Questions About Functions

- table format
  inputs | outputs
- graph format
- equation format

Short-Term Goals/Objectives:

- identify functions
- understand domain/range
- creation of functions

Inputs → Output

car
- hit brakes → stop

savings acct
- money → money grow

shopping
- money → item

Computer
- keyboard:

Inputs → Outputs

*every input has to have ONE exactly output

- type letter "S" → letter "S" on your screen
- "CTRL+C"
- right-click → copy
- edit → copy

→ copying text

3 inputs → same output
Computer functions correctly

"S" → "S", "K", "i" → computer is not functioning

Sep 14-2:46 PM

ex.
*pencil:
Input lead → Output writing
ex. cell phone
ex. car
Input gas → Output being able to drive
brakes → stop

ex. COMPUTER
Inputs → Outputs
- electricity → turn on
- search word → info about word
- type "S" → letter "S" on screen

every input has only 1 output

- "CTRL+C"
- right click, copy
- "edit→copy"
→ copy text

3 inputs produce the same output computer is functioning

- "S" key → "S", "d", "a"

Computer is NOT functioning correctly

* A function is a relation in which every input has exactly 1 output.

HW:
In: 0, 1, 2 → Outputs: 2, 3, 4
Is it a function Y/N?
No b/c "2" maps to more than 1 output

Sep 14-8:42 AM

Relations and Functions Class Work

Objective: Today you will be able to identify whether or not relations are functions, and explain why.

Think about a vending machine…

- How does the vending machine function?

- What would you consider an "input?"

- Is each input unique? Explain.

- What would you consider an "output?"

- What situation(s) may signal that the machine is NOT functioning correctly?

What about a computer?!

*Is it possible for one input result to more than one output??

*Is it possible for more than one input to result in the same output?

Sep 9-7:22 PM

Name: _____ Date: _____ Unit 3 Class Work

Relations and Functions Class Work

Objective: You will be able to identify whether or not relations are functions, support your identification, and state the domain and range of relations.

In the world of Algebra, there are a few vocabulary terms you must understand in order to grasp mathematical functions!

Definitions:

- **Relation:** relationship btwn 2 sets of info.
  - **Domain:** set of inputs (x-values)
  - **Range:** set of outputs (y-values)
  - *** FUNCTION:** a relation in which each input has exactly output

Guided Examples: Day 1: Determine whether or not each relation is a function.
Day 2: Identify the domain and range of each relation.

A. Set of Points

Consider the relation: {(-2,3), (1,8), (0,-7), (4,3)}
x y x y x y x y

Method 1: Mapping Diagram

*alphabetical order

Inputs (x): -2, 0, 1, 4
Outputs (y): -7, 3, 8

ascending order

Method 2: Vertical Line Test (VLT)

plot the points

every vertical line should pass through only once

Function: yes / no

Justification(s): each input produces only one output

if it's possible to list them, use set notation

Domain: x-values {-2, 0, 1, 4}
Range: y-values {-7, 3, 8}

NOT a function

3 outputs (y's) for 1 input (x)

B. EQUATION Is the equation $\sqrt{x+1} = y$ a function?

ex. $x=4$ $\sqrt{4+1}=y$ $y=2+1=3$

Function; every x produces only one y

If it were $\pm\sqrt{x+1}=y$

ex. $x=4$, $y=\pm 2+1$, $y=3$ ∴ $y=-1$ Not a function

What is the domain of the relation? (x-values)

0 & positives

$[0,\infty)$

$x \geq 0$

What is the range of the relation? (y-values)

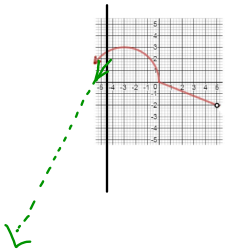
$\sqrt{0}+1=y$

$y=1$

$[1,\infty)$

$y \geq 1$

C. GRAPH



Function: yes / no

Justification: passes VLT

Domain: (x) left, right $(-\infty, 5)$ $x<5$

Range: (y) down, up or bottom, top $(-\infty, 3]$ $y \leq 3$

Now You Try Some!

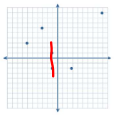
Name: _____ Date: _____ **Unit 3 Class Work**

Day 1: Determine whether or not each relation is a function.

Support your answer! ☺

Day 2: Identify the domain and range of each relation, using ALL appropriate notations.

1.



Function: yes / no

Justification: input of -1 produces 2 outputs

Domain:

Range:

---

2. $x = y^2$

ex. $x=9$, $9=y^2$, $y=3$, $y=-3$

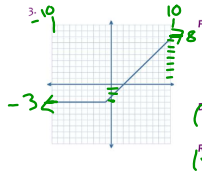
Function: yes / no

Justification: every input has a pos. & neg. output

Domain: (x) $[0,\infty)$ $x \geq 0$

Range: (y) all real #s $\mathbb{R}$ $(-\infty,\infty)$

3.



Function: yes / no

Justification: passes VLT

Domain: (x) left, right $(-\infty,\infty)$ $\mathbb{R}$

Range: (y) down, up $[-3,\infty)$ or $y \geq -3$

---

4. $\{(0,2), (3,2), (-7,1), (9,1), (3,8)\}$

Function: yes / no

Justification: "3" has two different outputs

Domain:

Range:

---

ex. $x=5$, $y=18$

5. $y = |2x + 8|$

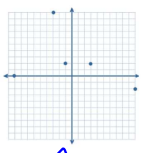
Function: yes / no

Justification: every input produces 1 output

Domain:

Range:

6.



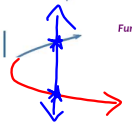
Function: yes / no

Justification: passes VLT

Domain:

Range:

7.



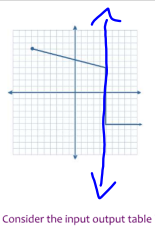
Function: yes / no

Justification: fails VLT

Name: _____ Date: _____ **Unit 3 Class Work**

Domain: Range:

8.



Function: yes / no

Justification: fails VLT

Domain: Range:

---

9. Consider the input output table below.

Input	-15	23	0	12	-3	
Output	3	0	8	2	3	9

a. Choose any value to place in the empty cell so that the table of values satisfies the definition of a function. Explain your choice.

-5, -4, 8, 1, -1, ...

b. Choose any value to place in the empty cell so that the table of values does not satisfy the definition of a function. Explain your choice.

0, -15, 23, 12, -3 already have outputs

10. Choose all values that can be placed in the empty cell so that the table of values satisfies the definition of a function.

Input	9	13	28	-12	-2	
Output	0	4	-8	4	-3	0

☐ -3 ☐ -13 ☐ 4

☐ 0 ☐ 9 ☐ 28

HOMEWORK Day 1: p. 59-60 #12-21, #40-45, 62, and 63

Day 2: p.59-60 #12, 17, 18, 19, 21 (just state the domain and range of each relation) and #36-39, & 58

Day 1:

Complete A is your favorite season is Summer or Winter.

Complete B if your favorite season is Spring or Fall.

A. Create any relation that IS a function. Explain your decision.

B. Create any relation that is NOT a function. Explain your decision.

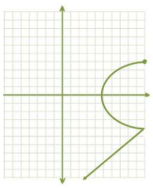
Write/Draw your function on the front of your post-it note,
& the answer on the back. ☺

Day 2:

Name: _____ Date: _____ Unit 3 Class Work

1. Determine whether or not each relation is a function. Then state the domain and range of each.

A. {(-2,4), (-1,3), (0,4)}

B. 

2. Write any questions you still have regarding functions, domain, and/or range. If you do not have any questions, create a problem that could be solved using any of these ideas. ☺