Relations and Functions Notes

Why are functions important to learn about?!	Thoughts/Questions About Functions
• they are the basis of almost ALL math 😊 ~engineering, accounting, finance, weather, science, technology,...	• Notation: f(x) "f of x"

Short-Term Goals
(which will help you achieve long-terms goals of understanding further concepts in this and future math courses)

~ identify function vs. non-function
~ identify domain's range of function
~ create, model with, & analyze functions

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Examples:

✱ CAR:
- input → output
- keys → · engine turns on
- press brakes → stops

✱ COMPUTER
- flash drive → · access to files
- type "s" → "s" appears
- "CTRL+C"
- right click, copy → COPY text
- edit-copy ✱multiple inputs can have same output

Non-Examples
input → output
- type "s" → "s", "x", "k" Not functioning
- hit brakes → stops, windows roll down NOT functioning

Each input should produce EXACTLY output

In general, what can we conclude about functions in terms of inp

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Domain and Range

Notation	When to Use	Example(s)

The Union:

3

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!
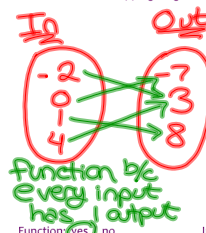
✎ *Definitions:*

☆ **Relation:** a relationship btwn 2 sets of info

✱remember alphabetical order ☆ **Domain:** all of the inputs (x-values)

☆ **Range:** all of the outputs (y-values)

✱ **FUNCTION:** when every input has exactly 1 output

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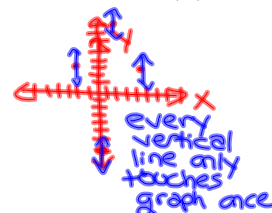Part 2: Identify the domain and range of each relation.

A. SET OF POINTS

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

Method 1: Mapping Diagram   *Method 2: Vertical Line Test (VLT)*

In → Out
-2, 0, 4 → 7, 3, 8

function bc every input has 1 output

every vertical line only touches graph once

ex. of non-function
2 outputs at this x-value

Function: yes no   Justification(s):

Domain:

Range:

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B. Equation   Is the equation $x = y^2$ a function?

ex.
Input
$x = 4 \rightarrow 4 = y^2 \rightarrow y = 2$
$y = -2$

In $4 <$ out $\begin{array}{c} 2 \\ -2 \end{array}$

NOT a function ex Input of 4 produces 2 outputs (2, -2)

What is the domain of the relation?   What is the range of the relation?

C. Graph   Function: (yes) no
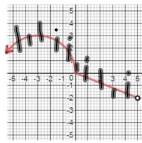
Justification:
passes VLT
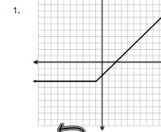each x matches
exactly 1 y

Domain:

Range:

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Part 1 Determine whether or not each relation is a function.
Support your answer! ☺
Part 2: Identify the domain and range of each relation, using ALL appropriate notations.

1.

Function: (yes) / no   *Justification:* passes VLT

Domain:

Range:

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

Function: (yes) / no   *Justification:* each input only produces output

$x = 4 \rightarrow \sqrt{4} + 1 = y$
$y = 2 + 1 = 3$
$x = 9 \rightarrow \sqrt{9} + 1 = y$
$y = 4$

Domain:

Range:

3. $\dfrac{3}{x - 5}$

Function: (yes) / no   *Justification:* every input has 1 output

Domain:

Range:

6

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

Function: yes (no)   *Justification:* input "3" produces 2 outputs

$-7 \rightarrow 1$
$0 \rightarrow 2$
$3 \rightarrow 8$
9

Domain:

Range:

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

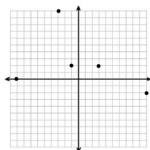**Function:** (yes) / no   *Justification:* each input has 1 output

In out
$x = 1 \quad y = 10$

Domain:

Range:

6.

Function: (yes) / no   *Justification:* every x matches only 1 y

Domain:

Range:

7

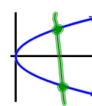---

7.

Function: yes (no)   *Justification:* most x values have 2 y-values

Domain: *Range:*
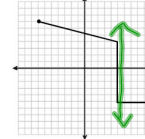
8.

Function: yes (no)   *Justification:* does not pass 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.

10, 6, -8, 29

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.

23, 0, 12, -15, -3

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   ☐ -15   ☑ 4
☐ 0   ☑ 9   ☐ 28

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Day 1:

Complete A is your favorite season is Summer or Winter.
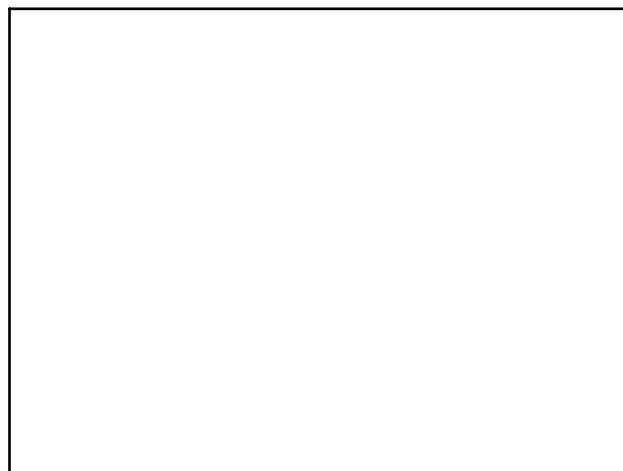
Complete B if your favorite season is Spring or Fall.

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

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

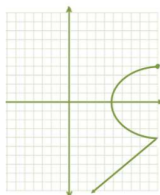**Write/Draw your function on the front of your post-it note, & the answer on the back.** ☺

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Sep 18-8:32 AM

Day 2:

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.

C. **Create any relation that IS a function. Explain your decision.**

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. ☺

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