

3.1 and 3.2 - Day 1- Explain – Functions - Notes

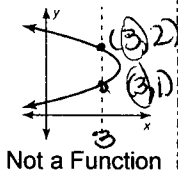
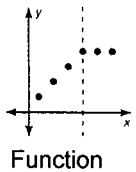
Essential Question: What is a function? How do you find the domain and range of discrete data?

Main Ideas/ Questions	Notes/Examples
What You Will Learn	<ul style="list-style-type: none"> To determine whether relations are functions. To find the domain and range of a function in mathematical problems and real-world situations.

8th Grade Review: What is a function?

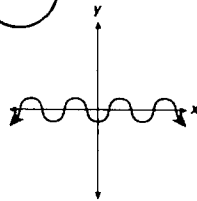
Each input has exactly one output - _____ CANNOT repeat!!

Vertical Line Test

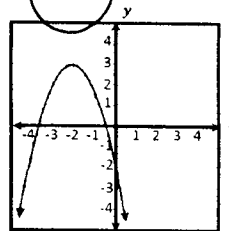


Practice: Determine if each relation is a function.

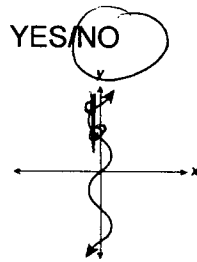
1. YES/NO



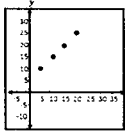
2. YES/NO



3. YES/NO



Types of Data



Discrete Data
(dots) - countable

Data that involves a count of items, such as the number of people or the number of cars.

On a graph..... indicated with a point (dot).... on a graph the points are disconnected.

(like # coins in a cup)

Practice: Determine if the given is a function and if it is discrete or continuous.

4. Function? YES/NO

DISCRETE/CONTINUOUS

Input			
Number of stories, x	1	2	3
Output			
Height of building (feet), y	12	24	36

5. Function? YES/NO

DISCRETE/CONTINUOUS

The battery power remaining on a smartphone at any given time.

6. Function? YES/NO

DISCRETE/CONTINUOUS

(# of Suitcases, Total Weight)

7. Function? YES/NO

DISCRETE/CONTINUOUS

(Time, Temperature Outside)

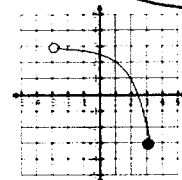
8. Function? YES/NO

DISCRETE/CONTINUOUS

$y = -2$

9. Function? YES/NO

DISCRETE/CONTINUOUS



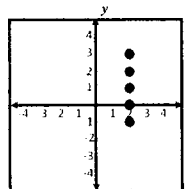
10. Function? YES/NO

DISCRETE/CONTINUOUS

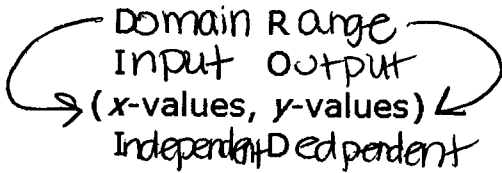
The depth of a scuba diver returning to the surface of an ocean after a certain amount of time.

10. Function? YES/NO

DISCRETE/CONTINUOUS



Domain and Range for Discrete Data



How are domain and range written for discrete data?

use { } braces

Mathematical Domain and Range

The set of all possible values of the independent and dependent variables.

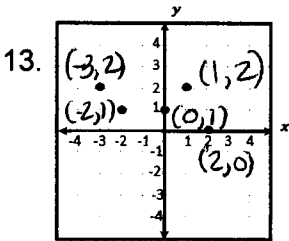
11. $\begin{matrix} x & y & x & y & x & y & x & y \\ \{(-1, 9), (5, 9), (2, 7), (4, -2)\} \end{matrix}$
 (you don't write it twice)

The DOMAIN is $x: \{-1, 5, 2, 4\}$
 The RANGE is $y: \{9, 7, -2\}$

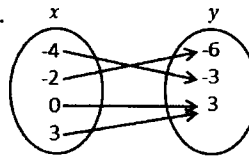
12.

Hats, x	2	3	4
Cost (dollars), y	36	54	72

The DOMAIN is $x: \{2, 3, 4\}$
 The RANGE is $y: \{36, 54, 72\}$



14. $\begin{matrix} x & y \\ \{-4, -2, 0, 3\} & \{-6, -3, 3\} \end{matrix}$
 DOMAIN: $\{-3, -2, 0, 1, 2\}$
 RANGE: $\{0, 1, 2\}$



DOMAIN: $\{-4, -2, 0, 3\}$
 RANGE: $\{-6, -3, 3\}$

15. The function $y = -3x + 12$ represents the amount y (in fluid ounces) of juice remaining in a bottle after you take x gulps. $-3(0) + 12 = 12 \dots$

a. The domain is 0, 1, 2, 3, and 4. What is the range?

x	0	1	2	3	4
y	12	9	6	3	0

Range = $\{12, 9, 6, 3, 0\}$

Reasonable Domain and Range

The set of all possible values of the independent and dependent variables that make sense in a real-world situation.

16. John's gift card is loaded with \$12. He plans to use his gift card to buy books that cost \$3 each.

x , # of books purchased, y , balance on giftcard

Reasonable Domain: $\{0, 1, 2, 3, 4\}$

Why is this function a discrete function?

Must purchase a whole book or nothing at all

Equation: $y = 12 - 3x$

Reasonable Range: $\{12, 9, 6, 3, 0\}$

x	y
0	12
1	9
2	6
3	3
4	0

17. Graduation tickets are \$15.95 per person. Each student can buy a maximum of three tickets.

x , # of tickets purchased, y , total amt owed for tickets

Reasonable Domain: $\{0, 1, 2, 3\}$

Why is this function a discrete function?

Tickets can't be torn in $\frac{1}{2}$, must purchase a whole

Equation: $y = 15.95x$

Reasonable Range: $\{0, 15.95, 31.90, 47.85\}$

x	y
0	0
1	15.95
2	31.90
3	47.85

18. Joe has an afterschool job at the local sporting goods store. He makes \$6.50 an hour. He always works at least 1 hour but never more than 5 hours in a week. Joe must work the full hour to get paid.

x , # hours worked, y , amount earned (\$)

Reasonable Domain: $\{1, 2, 3, 4, 5\}$

Why is this function a discrete function?

MUST WORK full hour to get paid

Equation: $y = 6.50x$

Reasonable Range: $\{6.50, 13, 19.50, 26, 32.50\}$

x	y
1	6.50
2	13
3	19.50
4	26
5	32.50

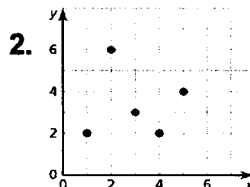
3.1 & 3.2 Day 1 – Discrete Functions

In Exercises 1 – 5, determine whether the graph/relation is a function and if it is discrete or continuous.

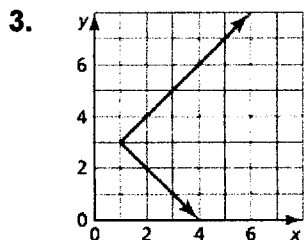
1.

Number of Gallons of Water, x	0	50	100	150
Total Weight of a Spa Tub, y	700	1100	1500	1900

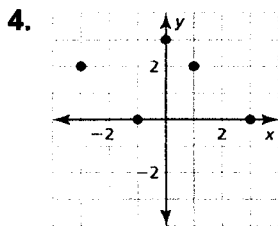
Function? YES or NO Discrete or Continuous



Function? YES or NO
Discrete or Continuous



Function? YES or NO
Discrete or Continuous



Function? YES or NO
Discrete or Continuous

5. The amount of money made from selling a certain number of individually wrapped candy bars.

Function? YES or NO
Discrete or Continuous

6. Which verbal situation represents a discrete function?

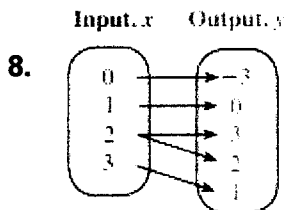
- A. The distance a runner ran during training and the time spent running,
- B. The cost of a bag of jelly beans and the number of pounds bought.
- C. The number of chairs needed for an assembly and the number of people attending the assembly.
- D. The height in inches of the juice in a bottle and the amount of juice that you drink.

In Exercises 7 - 9, determine if the discrete data is a function and then find the domain and range

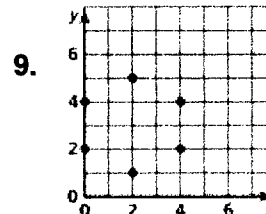
7. Fee for renting a kayak

Hours, h	1	2	3	4
Fee (dollars), f	9	18	27	36

Function? YES or No
Domain:
Range:



Function? YES or No
Domain:
Range:



Function? YES or No
Domain:
Range:

10. The function $a = -4b + 14$ represents the number a of avocados you have left after making b batches of guacamole.

a. The domain is 0, 1, 2, and 3. What is the range?

11. Stephanie earns \$8 per necklace that she sells at her craft booth. She only makes 10 necklaces to sell at this month's craft fair.

a. Define Variables: (_____ , _____)

b. Write an equation to represent the total amount Stephanie can make at the fair:

c. Reasonable Domain: _____ e. Is it possible for her to make \$64 at the fair? Explain your answer.

d. Reasonable Range: _____

12. So far, Sam has earned \$180 this month mowing yards. He earns \$30 for each lawn he mows. Sam's parents will not let him mow more than 4 lawns for the rest of the month.

a. Define Variables: (_____ , _____)

b. Write an equation to represent the amount of money Sam has at the end of the month:

c. Reasonable Domain: _____ e. Is it possible for him to make \$310? Explain your answer.

d. Reasonable Range: _____

13. A catering company charges \$25 per person plus a \$75 clean-up fee. Out of the 15 guest that have been invited, only one has responded so far that they will be attending.

a. Define Variables: (_____ , _____)

b. Write an equation to represent the total charged by the catering company.

c. Reasonable Domain: _____ e. Is it possible for the catering service to charge you \$210? Explain your answer

d. Reasonable Range: _____

14. A plane can carry a maximum cargo weight of 160,000 pounds. A company uses one of these planes to ship 2,000-pound containers. The total cargo weight is a function of the number of containers in the plane. What is the greatest value in the domain for this situation?

In problems 15 - 17, evaluate the expression when $x = 2$.

15. $10 - 2x + 8$

16. $4(x + 2 - 5x)$

17. $\frac{x}{2} + 5x - 7$