

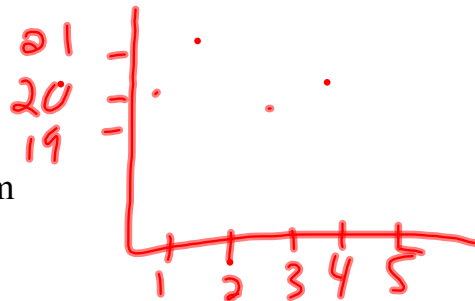
Math 1201:

Section 5.5: Graphs of Relations and Functions

Two Types of data:

Discrete Data can only take certain values.

Example: the number of students in a classroom

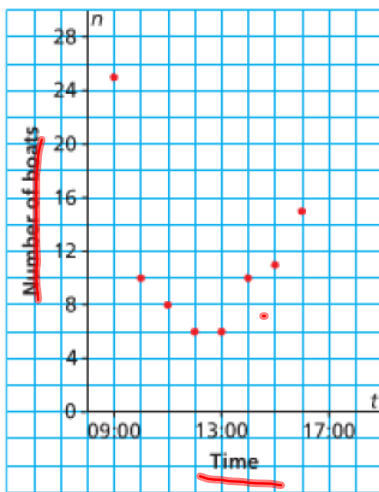


Continuous Data can take any value (within a range)

Example: a Person's height over time.



Number of Fishing Boats
Anchored in an Inlet



Discrete

Height of Tide at Port Clements,
June 17, 2009



Continuous

Domain and Range of a graph:

The **domain** of a function is the set of values for the independent variable. For a graph the domain is the x-values (horizontal).

The **range** of a function is the set of values for the dependent variable. For a graph the range is the y-values (vertical).

We will use a variety of ways to express the domain and range of a function:

- Words
- Lists (only for discrete data)
- Set Notation
- Interval Notation (only for continuous data)

For set notation you need to include the type of numbers that are included.

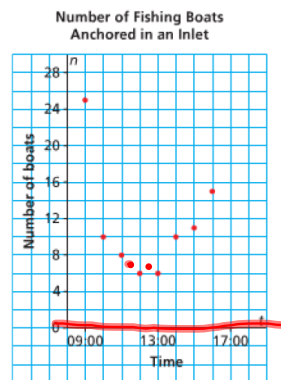
Words

When words are used to describe the domain and range of a discrete graph the elements for each set are just listed out.

Example:

Domain: Contain the points
9:00, 10:00, 11:00, 12:00, 13:00,
14:00, 15:00, 16:00.

Range: Contains the points 25, 10,
8, 6, 11, 15.



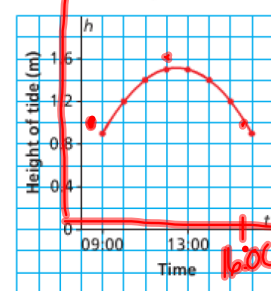
When words are used to describe the domain and range of a continuous graph interval(s) for each set are described,

Example:

Domain: Contains all real numbers
between 9:00 and 16:00

Range: Contains all real numbers
between 0.9 and 1.5.

Height of Tide at Port Clements,
June 17, 2009



Lists

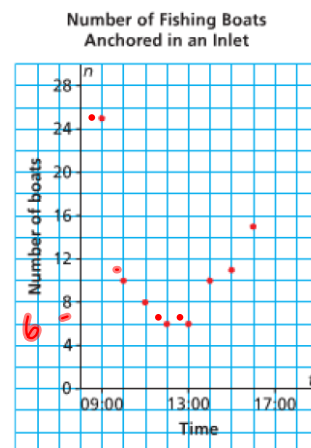
A list can only be used for discrete data. The domain is the set of x-values for each point and the range is the set of y-values for each point. You only list each element once, no matter how many times it occurs.

This is done the same way as it was for tables, ordered pairs and arrow diagrams.

Example:

Domain: $\{9:00, 10:00, 11:00, 12:00, 13:00, 14:00, 15:00, 16:00\}$

Range: $\{6, 8, 10, 11, 15, 25\}$



Interval Notation

This can only be used for continuous data.

Interval notation is a short way of representing an inequality. It looks similar to an ordered pair, but uses two different brackets.

A round bracket is used if the endpoint **is not** included and a square bracket is used if the endpoint **is** included.

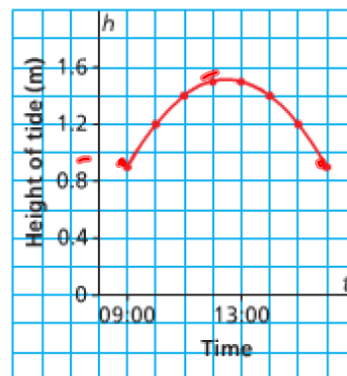
$() \rightarrow$ Not Included
 $[] \rightarrow$ Are included.

Example:

Domain: $[9:00, 16:00]$

Range: $[0.9, 1.5]$

Height of Tide at Port Clements,
June 17, 2009



Set Notation

Set notation uses an inequality to show what numbers are included in the domain and range. It has to be given in the following format.

$$D: \{x | -2 < x \leq 5, x \in \mathbb{R}\}$$

Set of x -values Such that Inequality $x \in \mathbb{R}$
 x belongs to the Set of Real numbers.



You have to indicate what type of numbers are included in the domain and range.

- $<$ - less than
- \leq - less than or equal to
- $>$ - Greater than
- \geq - Greater than or equal to

Example: Discrete Data

Is this a function? If yes Describe its domain and range

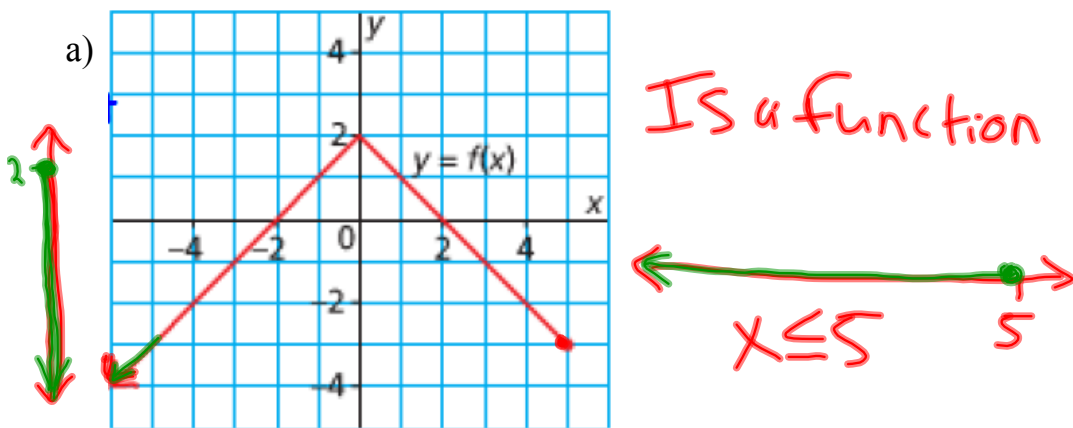
It is a function

Domain: $\{2, 4, 5, 7\}$

Range: $\{1, 4, 5, 7\}$

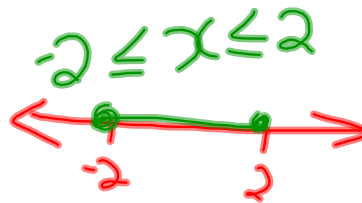
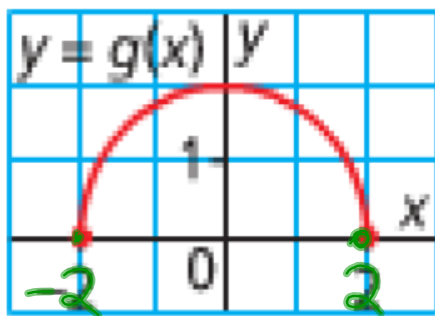


Example 1: Determine if the following graph represent functions.
Then describe the domain and range in words, interval notation and set notation.



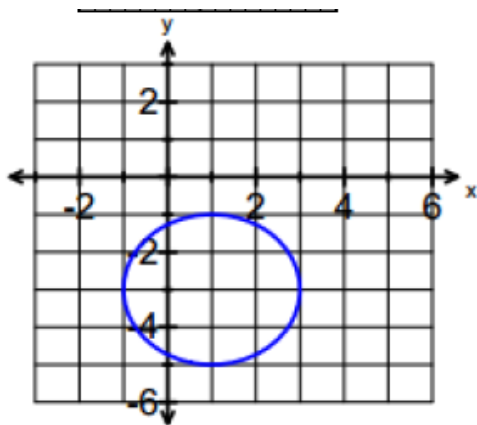
	Domain	Range
Words	All real numbers less than 5	All real numbers less than 2.
Set Notation	$\{x \mid x \leq 5, x \in \mathbb{R}\}$	$\{y \mid y \leq 2, y \in \mathbb{R}\}$
Interval Notation	$(-\infty, 5]$	$(-\infty, 2]$

b)



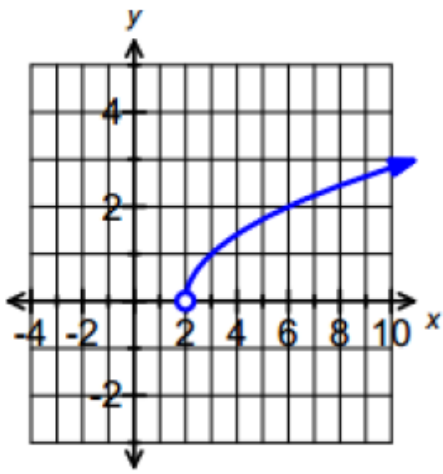
	Domain	Range
Words	All real numbers between -2 and 2	
Set Notation	$\{x \mid -2 \leq x \leq 2, x \in \mathbb{R}\}$	
Interval Notation	$[-2, 2]$	

c)



	Domain	Range
Words		
Set Notation		
Interval Notation		

d)



	Domain	Range
Words		
Set Notation		
Interval Notation		

HOMEWORK

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