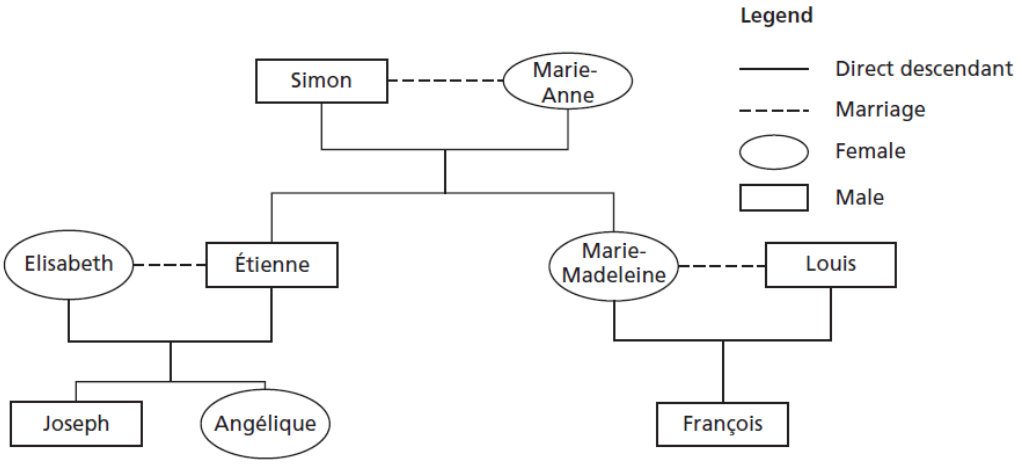
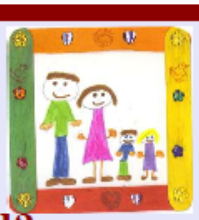

Chapter 5
Functions & Relations

5.1 Representing Relations

How are we Related !!!!



- How is Joseph related to Simon?
- How are Angelique and Francois related?
- How does the family tree show these relations?



Terminology

A *set* is a collection of distinct objects.

Set of Fruit

Fruit
apple
blueberry
cherry
huckleberry

Set of Colours

Colour
red
green
blue

Sets use { }

Ordered pairs use (__, __)

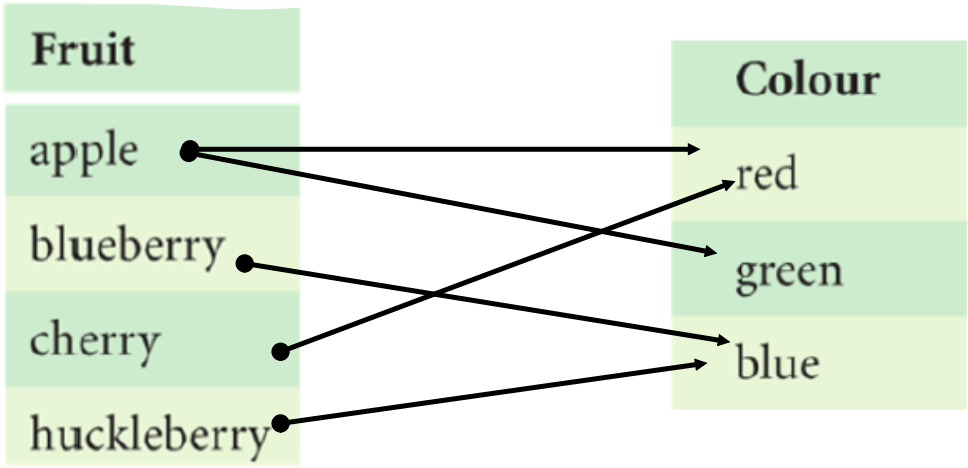
An *element* of a set is one object in the set.

Set of Fruit
Fruit
apple
blueberry
cherry
huckleberry

***Apple* is an element of the set of Fruit**

Terminology

Arrow diagram show how one set is related to another set



Sets use { }

Ordered pairs use (__, __)

Set of ordered pairs

{ (Apple, red), (apple, green), (Blueberry, Blue), (Cherry, red), (Huckleberry, blue)}

Independent / Dependent

Dependent - a variable whose value is determined by the value of another(independent) variable.

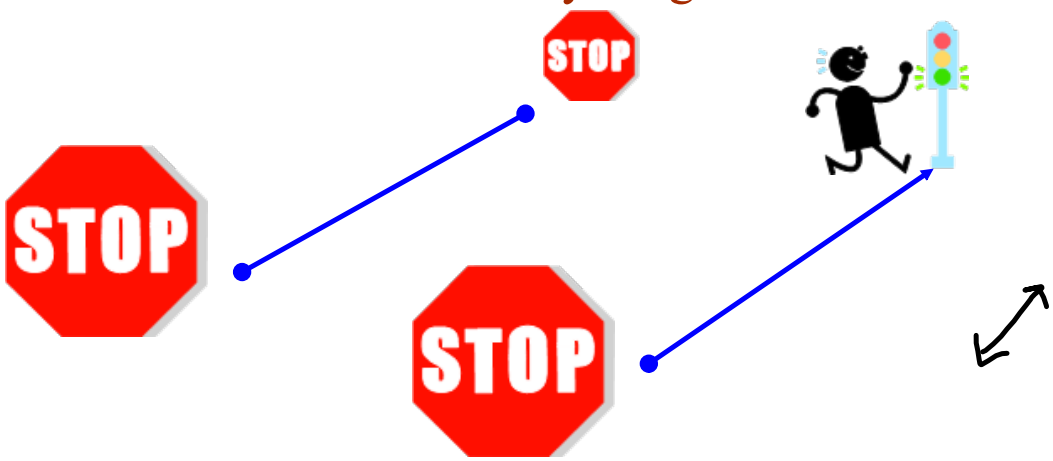
(y) or range

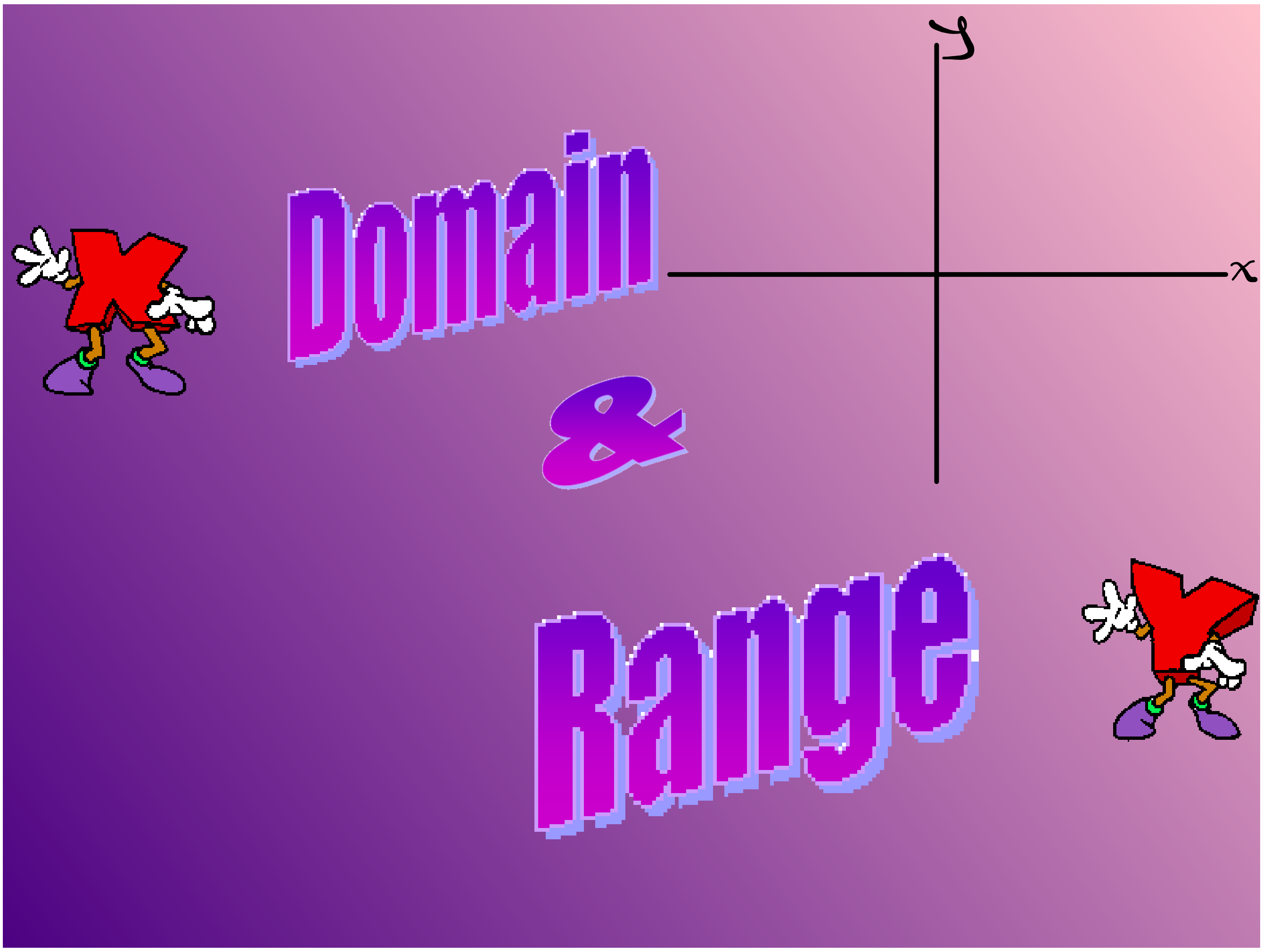
Independent - a variable whose value is not determined by the value of another variable, and whose value determines the value of another (dependent) variable

(x) or domain

Limits?

There are limits to everything in life!




Domain
&
Range
X
Y
x
y

Domain & Range

Domain - the set of first elements in a relation

Range - the set of second elements in a relation

Input	Output
1	5
2	7
	9
4	
	13

x y

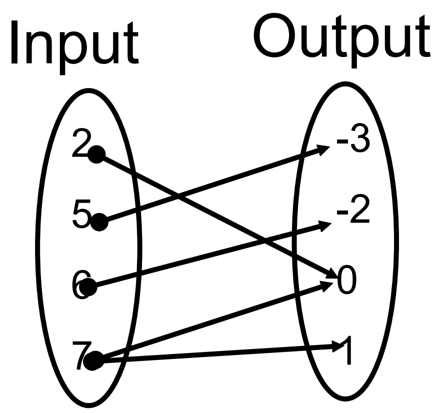
Sport	Equipment
badminton	shuttlecock
badminton	racquet
hockey	puck
hockey	stick
tennis	ball
tennis	racquet
soccer	ball

First **Second**

(Sport, Equipment)

Domain The set of first elements:
{ badminton, hockey, tennis, soccer}

Range The set of second elements:
{ shuttlecock, racquet, puck, stick, ball}



This is an arrow diagram. Follow the arrows to write the set of ordered pairs.

The set of ordered pairs is

{(2,0), (5,-3), (6,-2), (7, 0), (7, 1)}

There are two types of graphs and data

Discrete and Continuos Data

Discrete Data

- points are not joined together with a line on the graph.

-A finite number of values exist between points

- hint ask yourself can you have part of a "x" value. If no then discrete

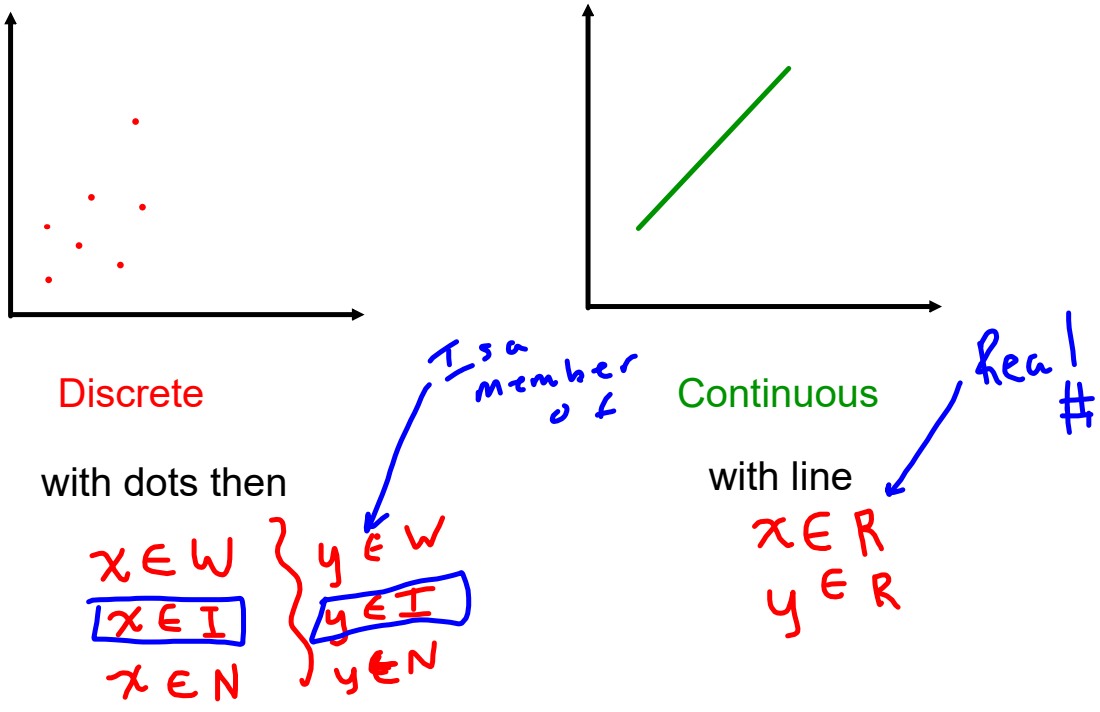
Continuous Data

- points **are** joined together with a line on the graph.

-A infinite number of values exist between points

- hint ask yourself can you have part of a "x" value. If yes then continuous

Examples)



Review from Grade 6 & 8

For Word Problems Ask yourself

"Can you have part of the data on the x axis or the y axis?"

If yes ,then it is continuos.

If no, then discrete

Examples:

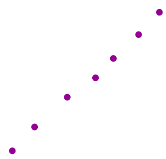
1) Remember the example graphing the number of people at a dance between 9 and 10 o'clock

You can have part of a time BUT cannot have part of a person at the dance. So DISCRETE

2) Graphing the temperature of a lake from 7:00 pm to 7:00 am

You can have part of a time AND you can have part of a temperature. So CONTINUOUS

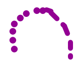
Linear & Non-Linear



Linear graphs - the data is a single straight line

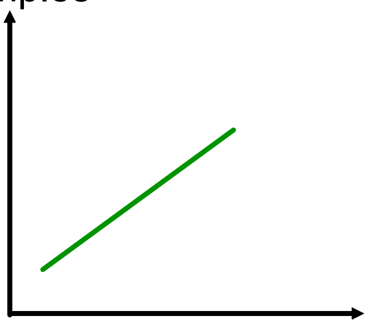
(Doesn't have to be connected)

Non-Linear graphs - the data is NOT a straight line

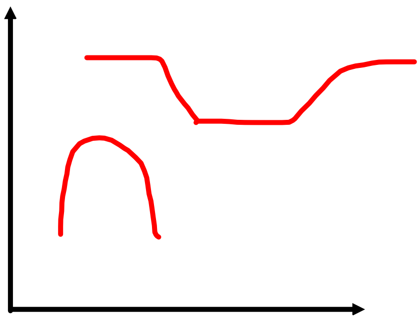


- It can curve or spread out with no real pattern.

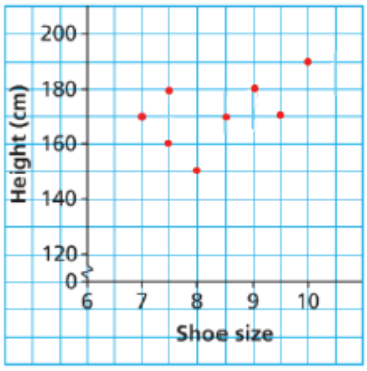
Examples



Linear



Non-Linear



a) State the domain & range.

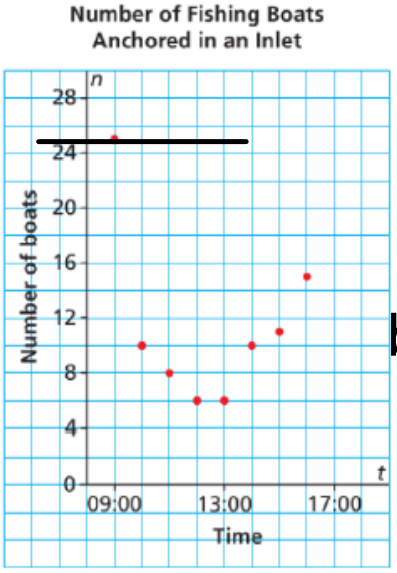
D { 7, 7.5, 8, 8.5, 9, 9.5, 10 }

R { 150, 160, 170, 180, 190 }

b) Why are the points not connected? Explain.

discrete - (dots)

Shoes do not come in partial sizes (No 7.1 or 7.3)



a) State the domain & range.

D { 9, 10, 11, 12, 13, 14, 15, 16}

R{6, 8, 10, 11, 15, 25}

b) Why are the points not connected? Explain

discrete since you cannot have part of a boat docked

How do you state the Domain & Range?

When connected lines

How to write Range

highest
lowest

such that

$$\{y \mid \square \leq y \leq \square, y \in \square\}$$

lowest
highest

is a member
R contains D is

How to write Domain

$$\{x \mid \square \leq x \leq \square, x \in \square\}$$

left
Right

You can use this for dots as well as long as you say $x \in I$

How to write Range

$\{y \mid -2 \leq y \leq 5, y \in I\}$

low

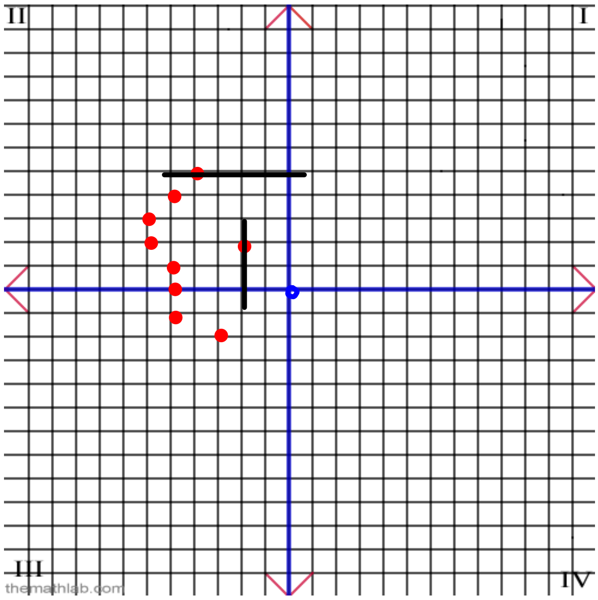
How to write Domain

$\{x \mid -6 \leq x \leq -2, x \in I\}$

left

I will use this

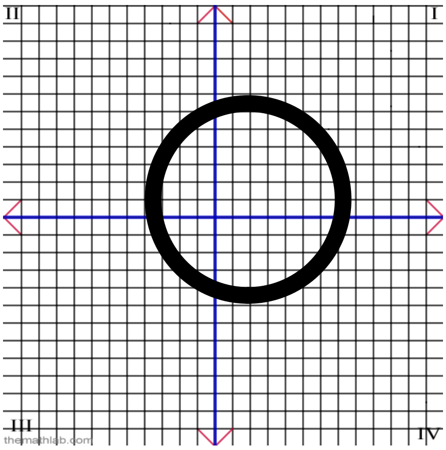
or you can list as a set



Domain {-6, -5, -4, -3, -2}

Range: {-2, -1, 0, 1, 2, 3, 4, 5}

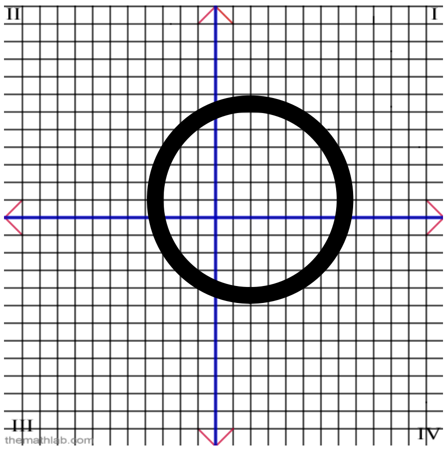
Domain



The **domain** represents all the values of x.

X is the independent Variable

Range

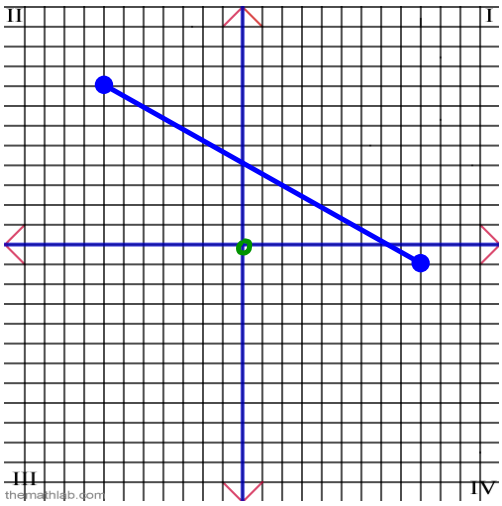


The **range** represents all the values of y.

Y is the dependent Variable

EXAMPLES!

1.



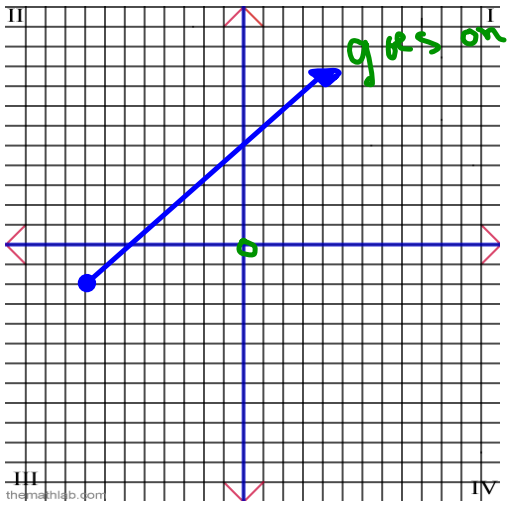
Domain: {x I -7 ≤ x ≤ 9, x ∈ R}

Range: {y I -1 ≤ y ≤ 8, y ∈ R}

Is it continuos or discrete?

Is it linear or non linear?

2.



Domain: {x I -8 ≤ x , x ∈ R }

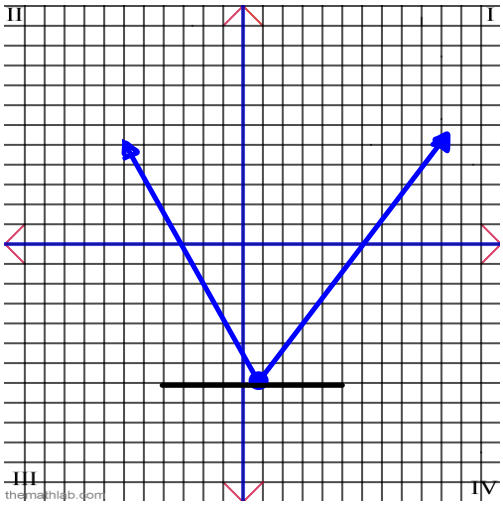
Range: {y I -7 ≤ y , y ∈ R }

Is it continuos or discrete?

Is it linear or non linear?

EXAMPLES!

3.



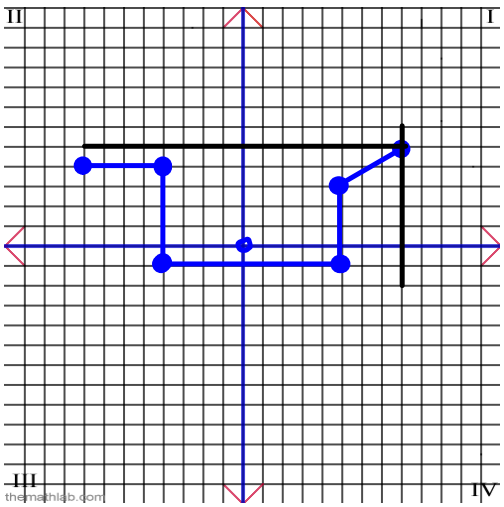
Domain: {x l x ∈ R }

Range: {y l -7 ≤ y , y ∈ R }

Is it continuos or discrete?

Is it linear or non linear?

4.



Domain: {x l -8 ≤ x ≤ 8 , x ∈ R}

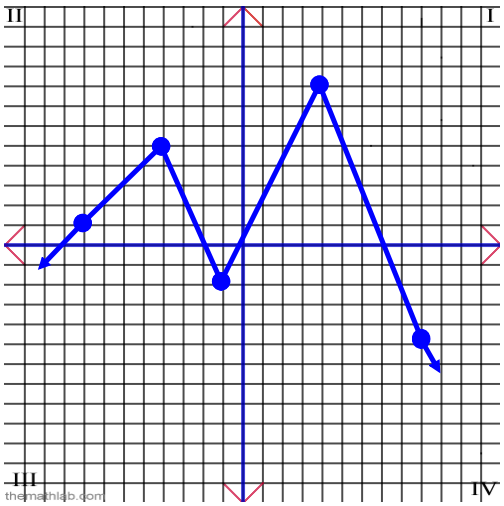
Range: {y l -1 ≤ y ≤ 5 , y ∈ R }

Is it continuos or discrete?

Is it linear or non linear?

EXAMPLES!

5.



Domain: {x I x ∈ R }

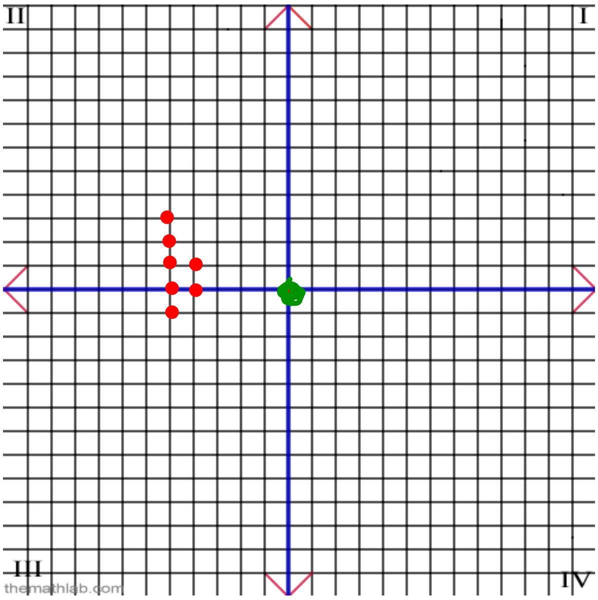
Range: {y I y ≤ 8 , y ∈ R }

Is it continuos or discrete?

Is it linear or non linear?

EXAMPLES!

7.



Domain: {x l -5 ≤ x ≤ -4, x ∈ I }

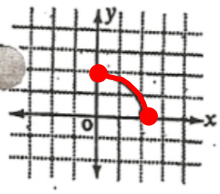
Range: {y l -1 ≤ y ≤ 3, y ∈ I}

Is it continuos or discrete?

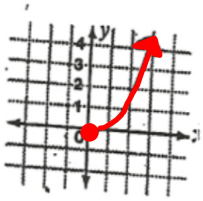
Is it linear or non linear?

Class/Homework Write the domain, range, is it continuous or discrete, and is linear or nonlinear.

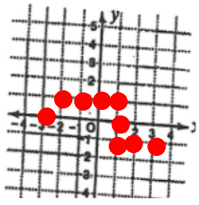
a



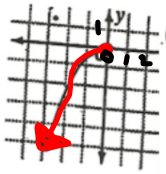
(b)



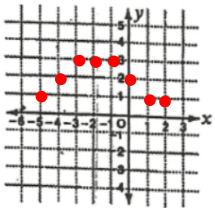
(c)



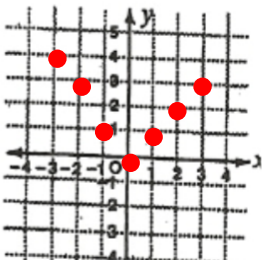
(d)



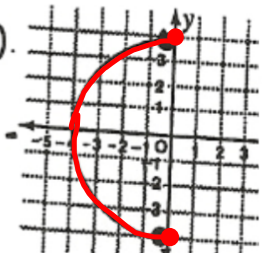
(e)



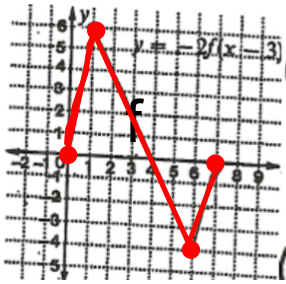
f)



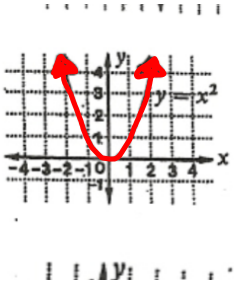
(g)



(h)

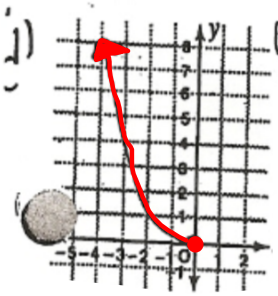


(i)

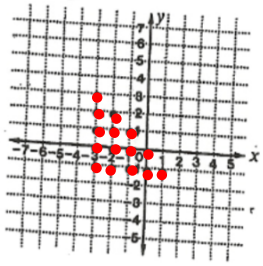


Class/Homework Write the domain, range, is it continuous or discrete, and is linear or nonlinear.

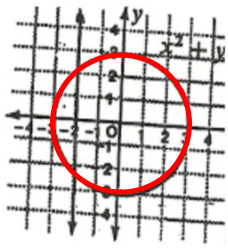
j)



(k)



(l)



a)