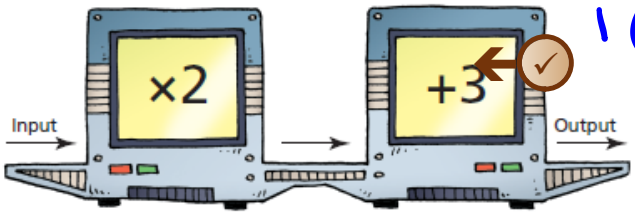
5.2 Properties of Functions

LESSON FOCUS Develop the concept of a function.

Make Connections

$y = 2x + 3$



Input	Output
1	5
3	
	11
5	

+2

As input increase by 1, Output increase by 2

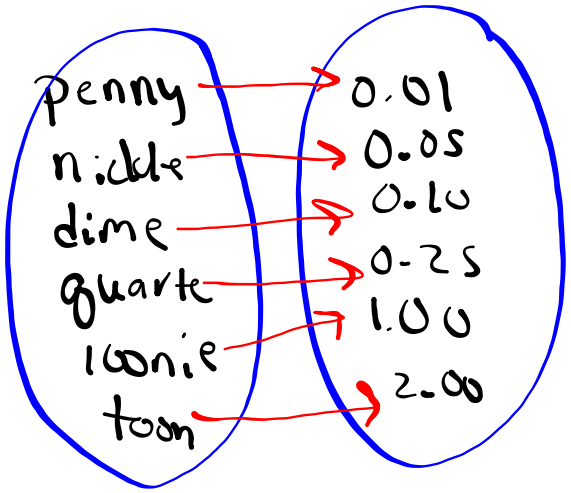
What is the rule for the Input/Output machine above?

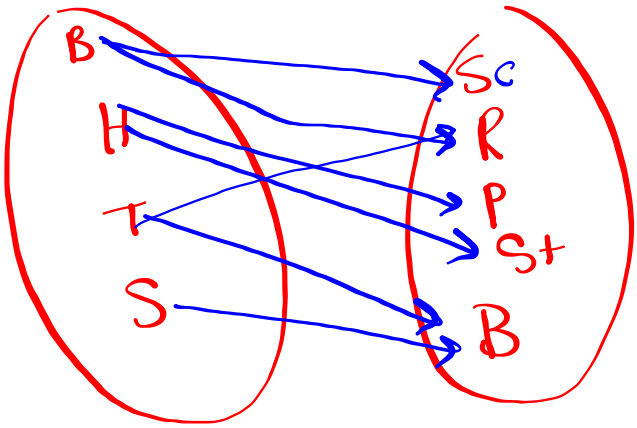
Which numbers would complete this table for the machine?

3a) Compare coin to its value.

3b) i) {(penny, 0.01), (nickle, 0.05), (dime, 0.10), (quarter, 0.25), (loonie, 1.00), (toonie, 2.00)}
(x, y)

i.)





Independent / Dependent

(output)
(y)

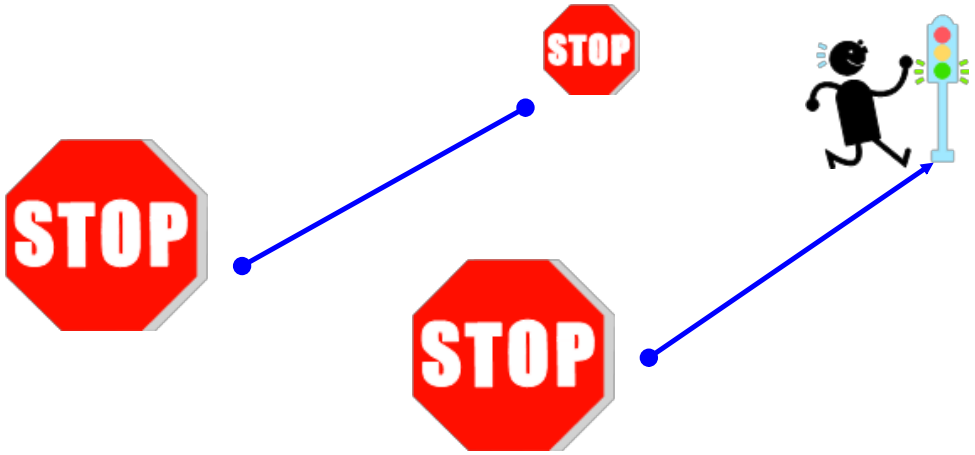
Dependent - a variable whose value is determined by the value of another(independent) variable.

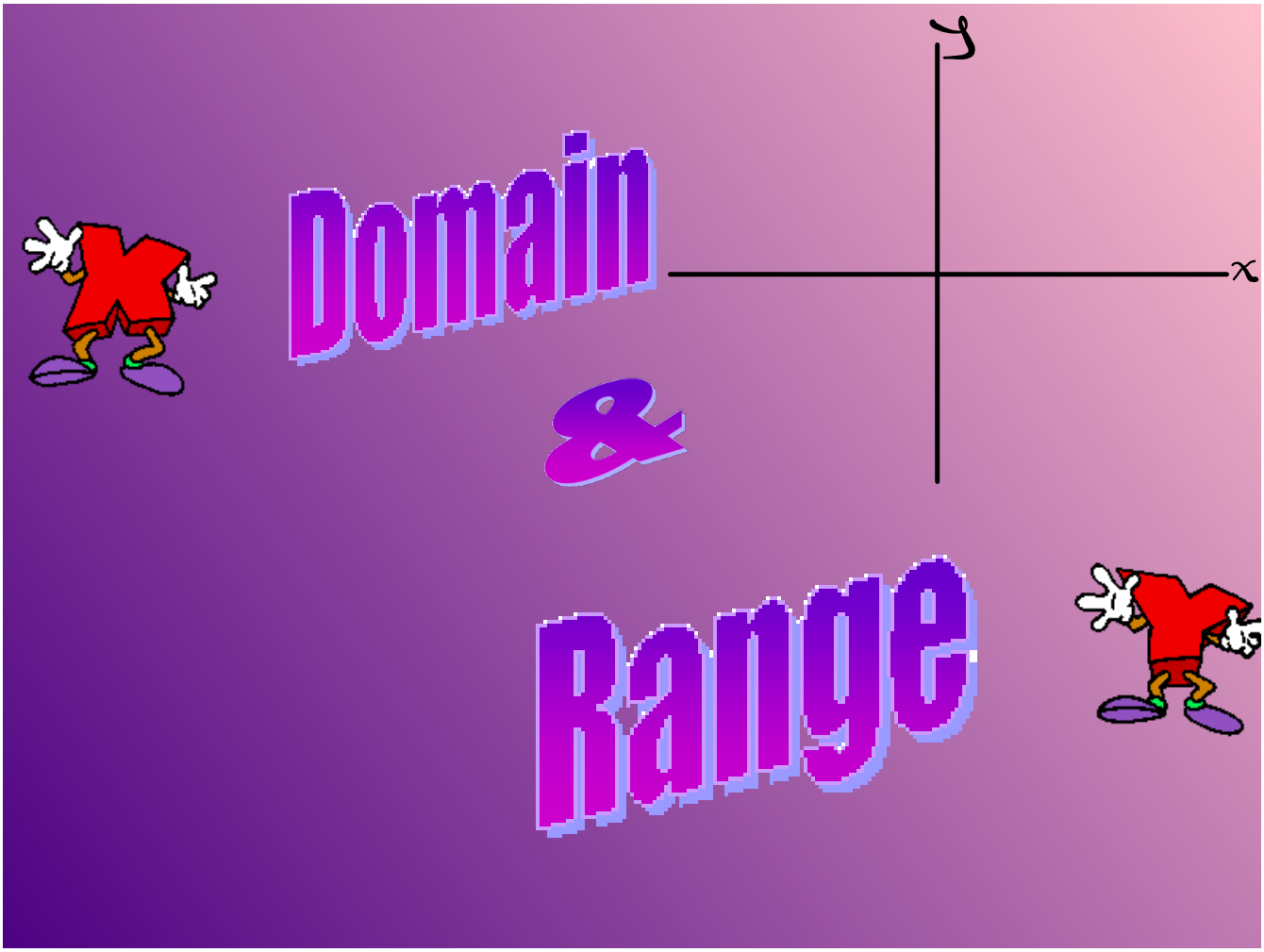
Independent - a variable whose value is not determined by the value of another variable, and whose value determines the value of another (dependent) variable

input
(x)

Limits?

There are limits to everything in life!




Domain
&
Range
y
x

Domain & Range

Domain - the set of first elements in a relation
→ x values
↳ input

Range - the set of second elements in a relation
↳ output
↳ "y"

Input	Output
1	5
2	7
3	9
4	11
5	13

Domain: {1, 2, 3, 4, 5}

Range: {5, 7, 9, 11, 13}

Domain and Range

Dr. Math says...

" The domain of a function is the set of all the stuff you can plug into the function. "

" The range of a function is the set of all the stuff you can get out of the function. "

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

First **Second**

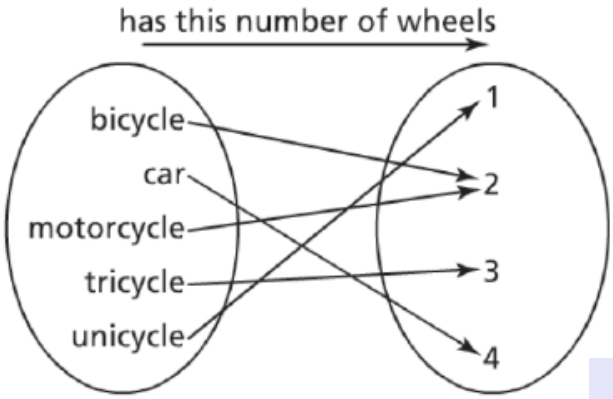
(Sport, Equipment)

Domain

The set of first elements:
{badminton, hocky, tennis, Soccar}

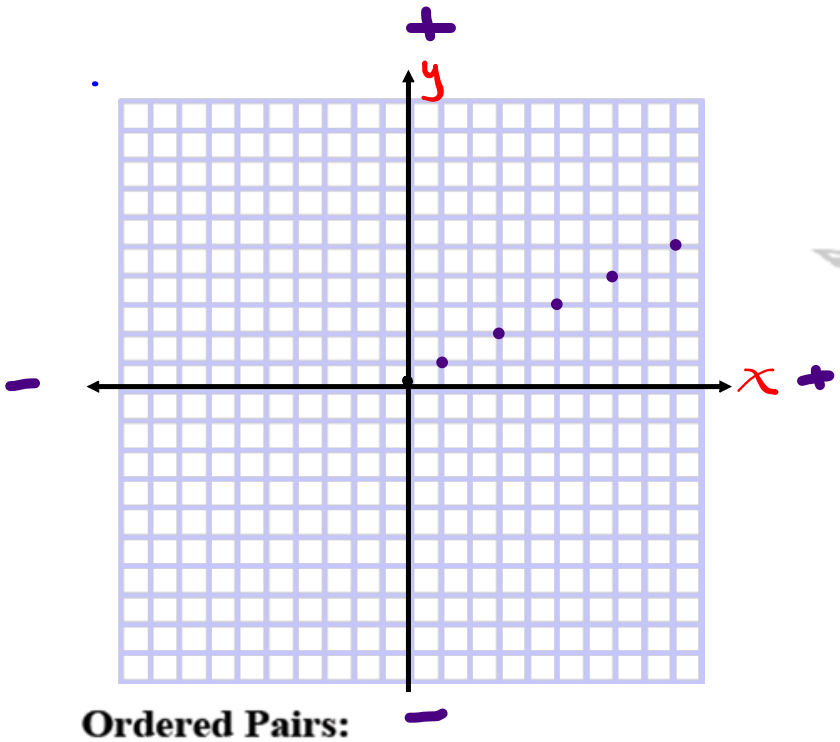
Range

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



Domain The first set of elements:
{bicycle, car, motorcycle, tricycle, unicycle}

Range The second set of elements:
{1, 2, 3, 4}



Remember!!

(x, y)

$(\leftrightarrow, \updownarrow)$

Ordered Pairs:

1st 2nd 1st 2nd 1st 2nd 1st 2nd 1st 2nd

$\{(1,1), (3,2), (5,3), (7,4), (9,5)\}$

Domain The set of first elements: $\{1,3,5,7,9\}$

Range The set of second elements: $\{1,2,3,4,5\}$

$\{(2,2)\ (1,2)\ (-3,5),\ (-2,1)\ ,(5,8)\}$

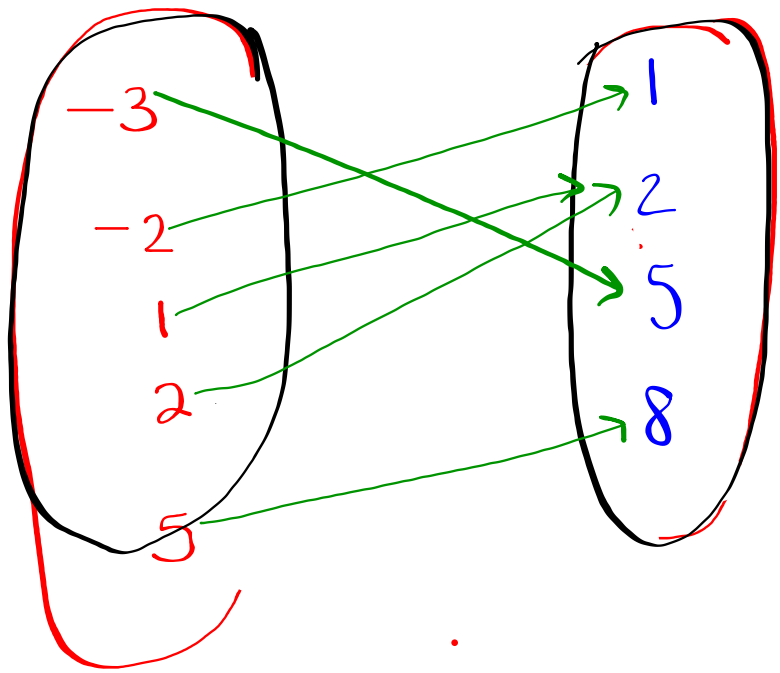
State Domain & Range

Domain : $\{-3,-2,1,2,5\}$

Put in order from least to greatest

Range : $\{1,2,5,8\}$

<> won't matchup



How do you state the range?

When connected lines

$$\{y \mid y \le 5, y \in R\}$$

such that; is a member of; Real Number

$$\{y \mid -5 \le y \le 8, y \in I\}$$

Natural (N) → 1, 2, 3, 4

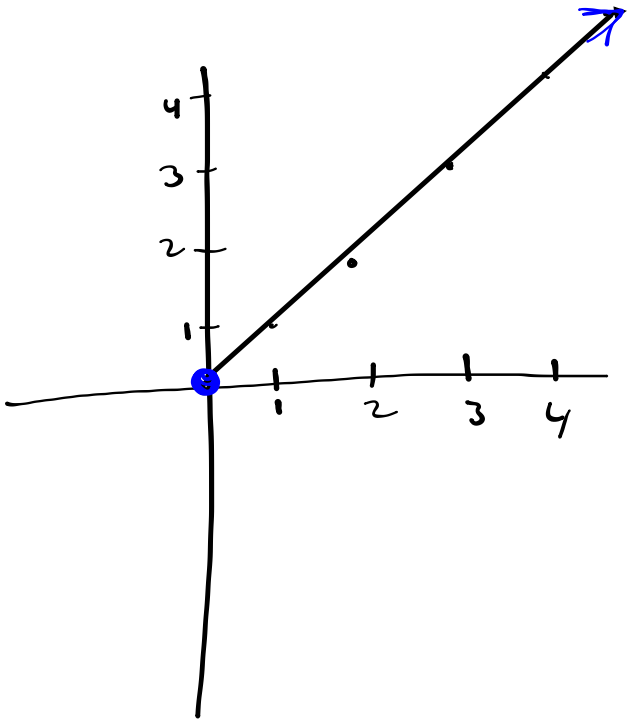
Whole (W) → 0, 1, 2, 3, 4

Integers (I) = -2, -1, 0, 1, 2, 3, 4

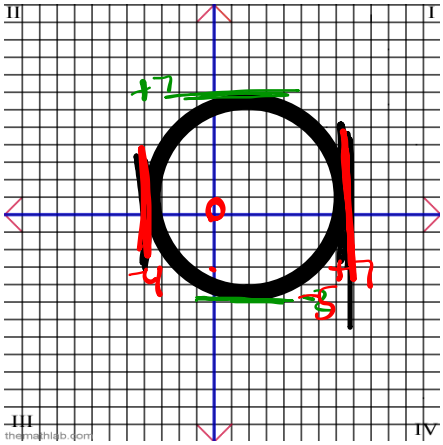
Rational (Q) = all numbers that terminate or can be written as a fractions

Real (R) = includes all N, W, I, Q

$\overline{Q}$ Irrational → all #s that don't repeat or terminate


4
3
2
1
1
2
3
4

Domain

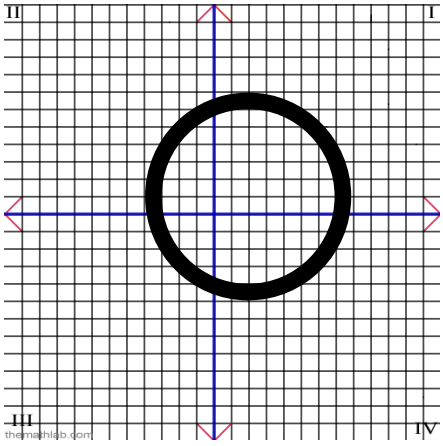


The **domain** represents all the values of x.

X is the independent Variable

$\{x \mid -4 \leq x \leq 7, x \in R\}$

Range



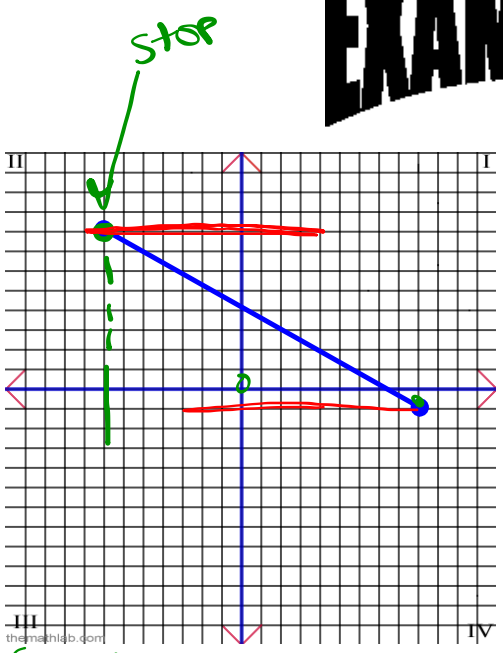
The **range** represents all the values of y.

Y is the dependent Variable

$\{y \mid -5 \leq y \leq 7, y \in R\}$

EXAMPLES!

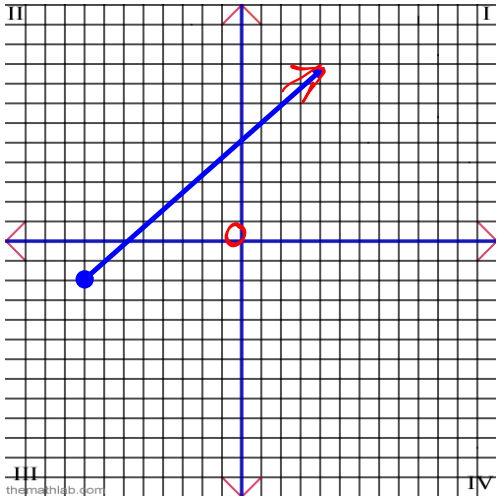
1.



$\{x \mid -7 \leq x \leq +9, x \in R\}$

$\{y \mid -1 \leq y \leq 8, y \in R\}$

2.



$\{x \mid -8 \leq x, x \in R\}$

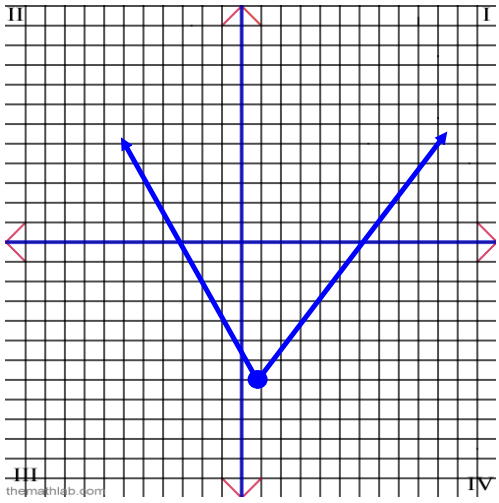
$x \geq -8, y \in R\}$

$y \mid y \geq -2, y \in R\}$

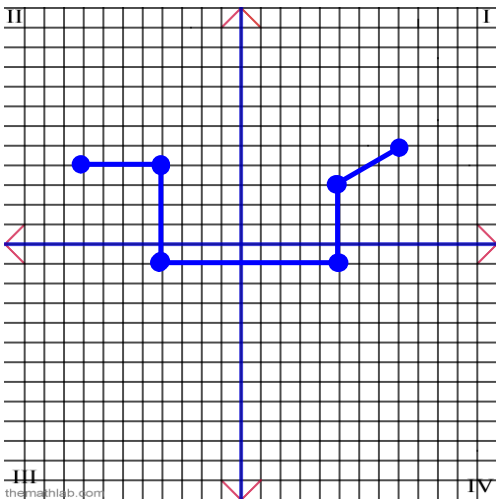
$-2 \leq y$

EXAMPLES!

3.

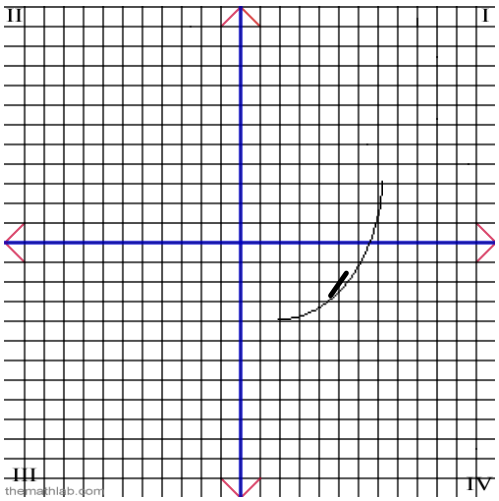


4.

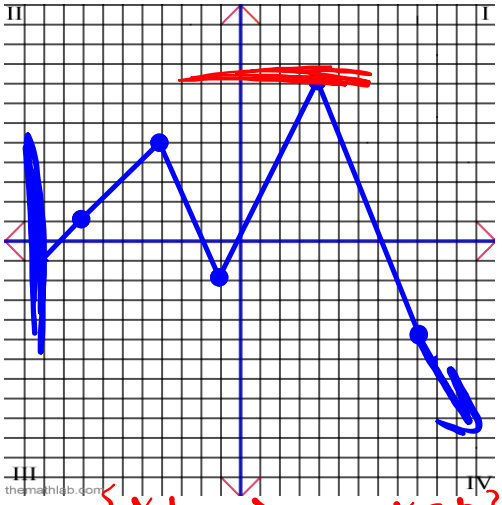


EXAMPLES!

5.



6.



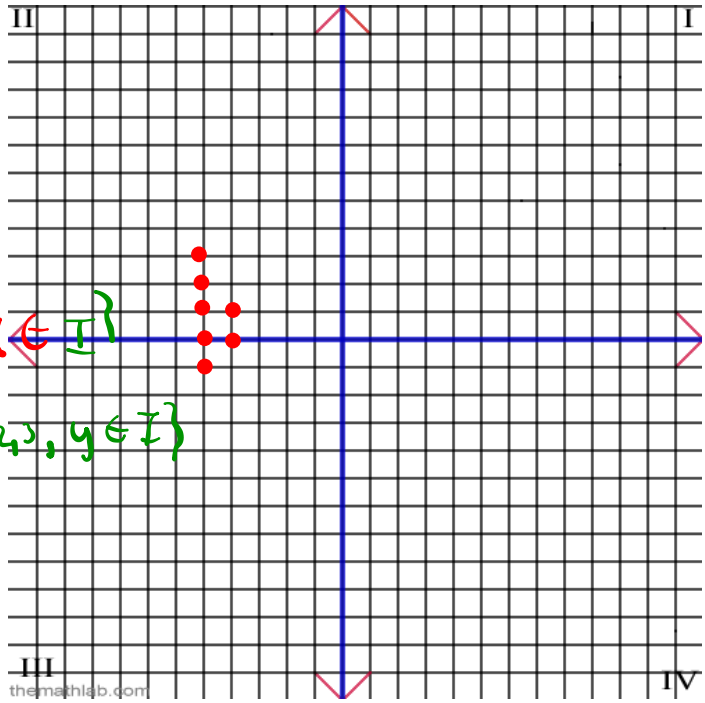
$\{x \mid x \geq -10, x \in \mathbb{R}\}$

$\{y \mid y \leq 8$

$x \mid \text{smallest} \leq x \leq \text{Biggest}, x \in \_\}$

EXAMPLES!

7.



Domain $\{-3, -4\}$

Range $\{-1, 0, 1, 2, 3\}$

$\{x \mid 4, -3, x \in I\}$

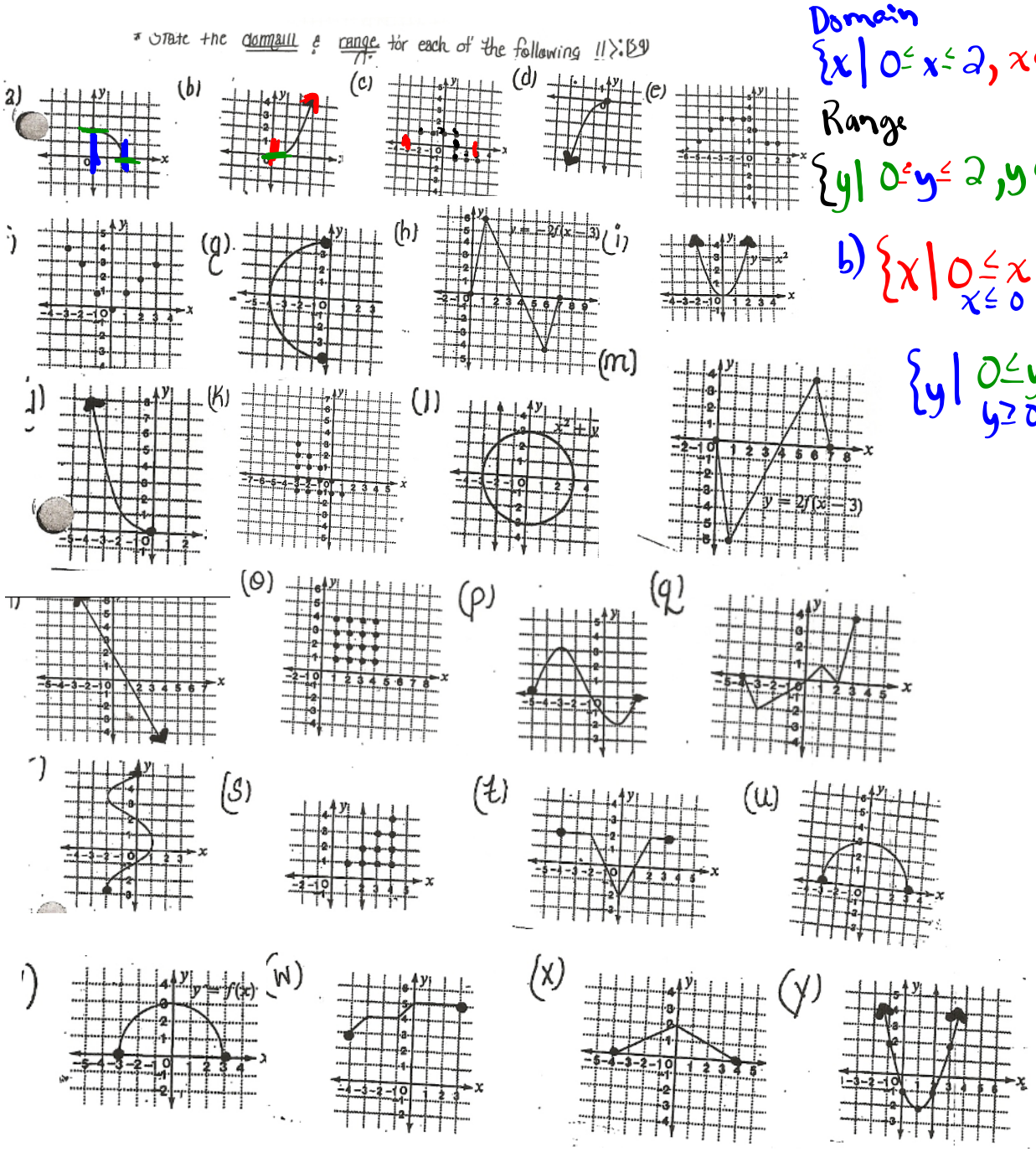
$\{y \mid -1, 0, 1, 2, 3, y \in I\}$

Homework

domain and range from graphs (Worksheet 1)

finish a to m

* State the domain & range for each of the following !!>:D9



Domain

$\{x \mid 0 \leq x \leq 2, x \in R\}$

Range

$\{y \mid 0 \leq y \leq 2, y \in R\}$

b) $\{x \mid 0 \leq x, x \in R\}$

$x \leq 0$

$\{y \mid 0 \leq y, y \in R\}$

$y \geq 0$

c) Domain $\{-3, -2, -1, 0, 1, 2, 3\}$

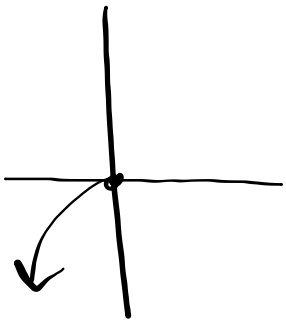
$\{x \mid -3 \leq x \leq 3, x \in I\}$

Range $\{-1, +1\}$

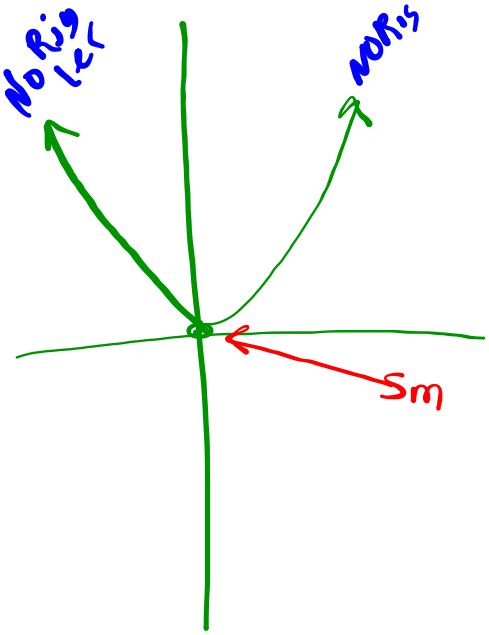
$\{y \mid -1 \leq y \leq 1, y \in I\}$

$\{x \mid \underline{\text{smallest (left value)}} \leq x \leq \underline{\text{Biggest (Right value)}}, x \in \_\_\}$

$\{y \mid \underline{\text{lowest}} \leq x \leq \underline{\text{highest}}, y \in \_\_\}$



$\{x \mid x \leq 0, x \in R\}$



$\{x \mid \cancel{-\infty < x < \infty}, x \in R\}$

$\{x \mid x \in R\}$

$\{y \mid 0 \le y, y \in R\}$

$y \ge 0$

Attachments

Domain & Range 1.doc