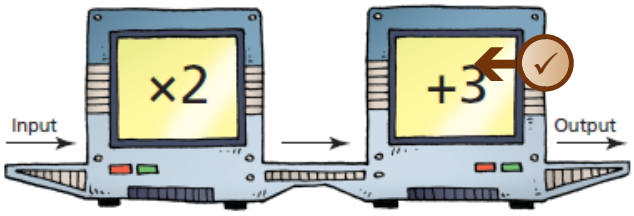
5.2 Properties of Functions

LESSON FOCUS Develop the concept of a function.

Make Connections



Input	Output
1	5
3	
	11
5	

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

Which numbers would complete this table for the machine?

Independent / Dependent

y

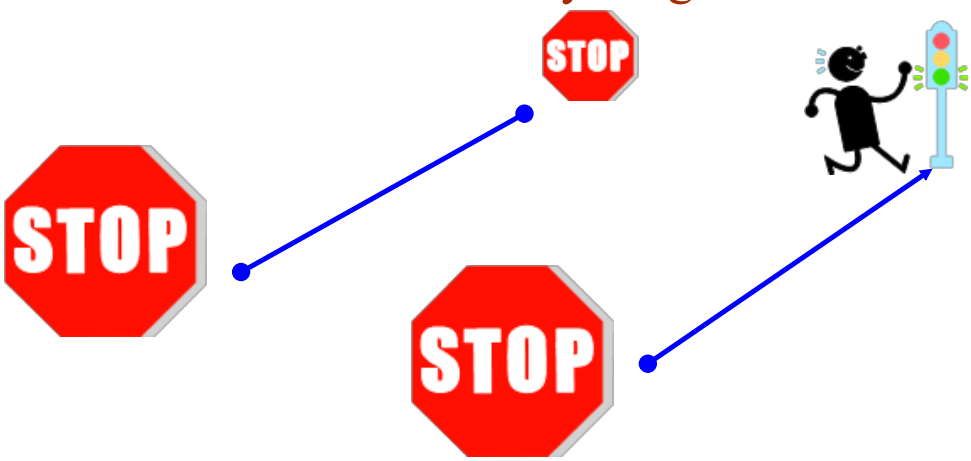
Dependent - a variable whose value is determined by the value of another(independent) variable.

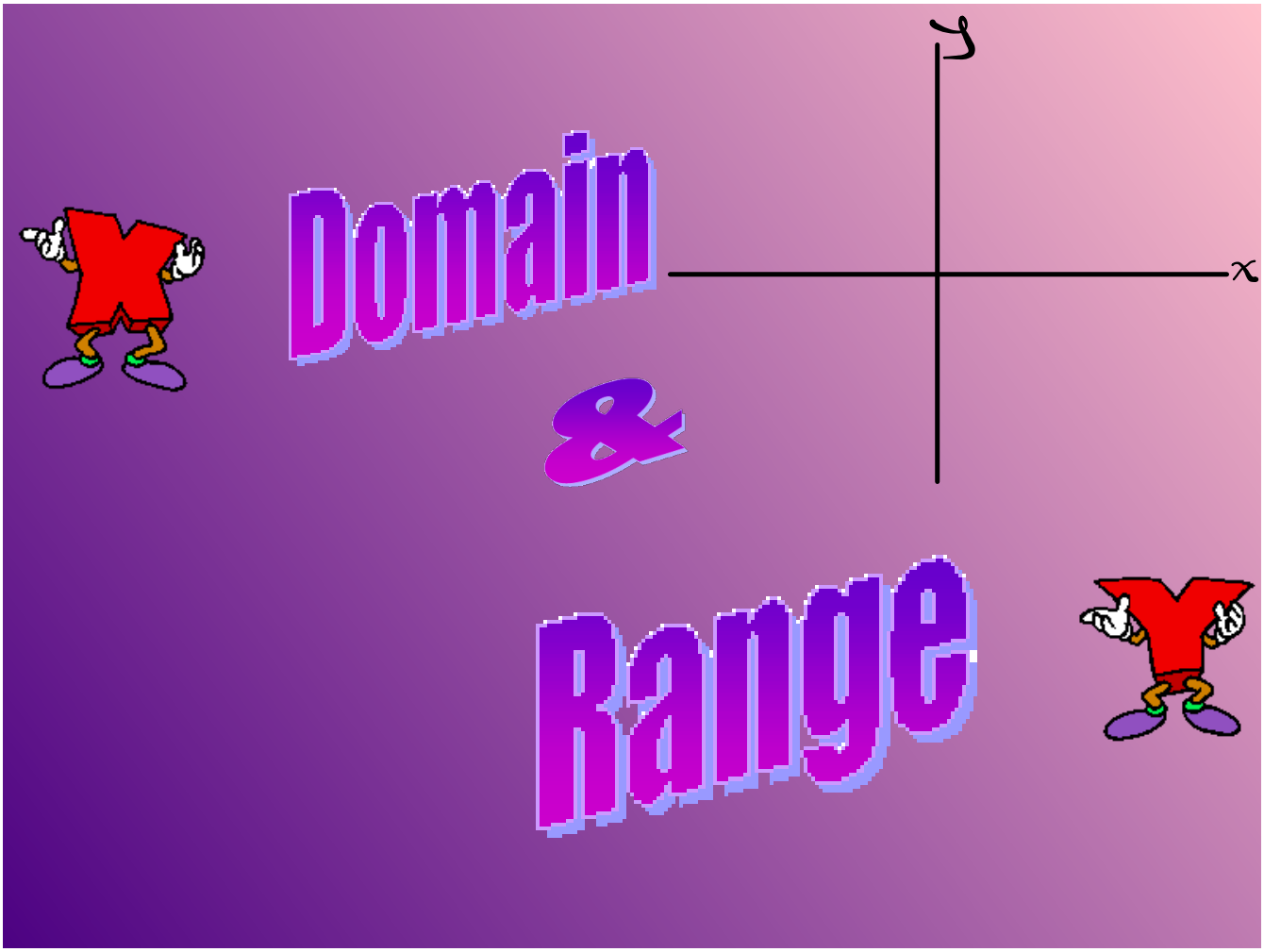
Independent - a variable whose value is not determined by the value of another variable, and whose value determines the value of another (dependent) variable

x

Limits?

There are limits to everything in life!




Domain
&
Range
y
x

Domain & Range

Domain - the set of first elements in a relation

Range - the set of second elements in a relation

Domain {1, 2, 3, 4}

Range {5, 7, 9, 13}

x Input	y Output
1	5
2	7
3	9
4	
	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

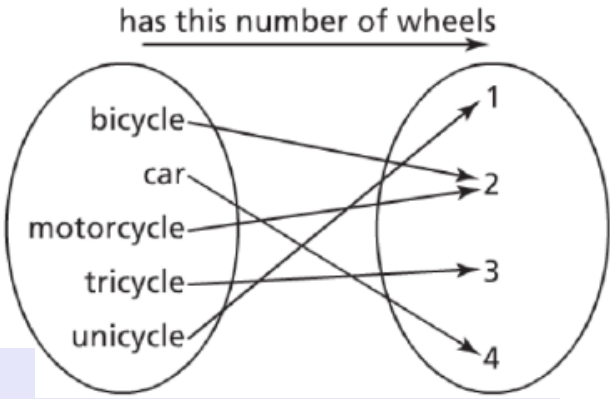
(Sport, Equipment)

Domain

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

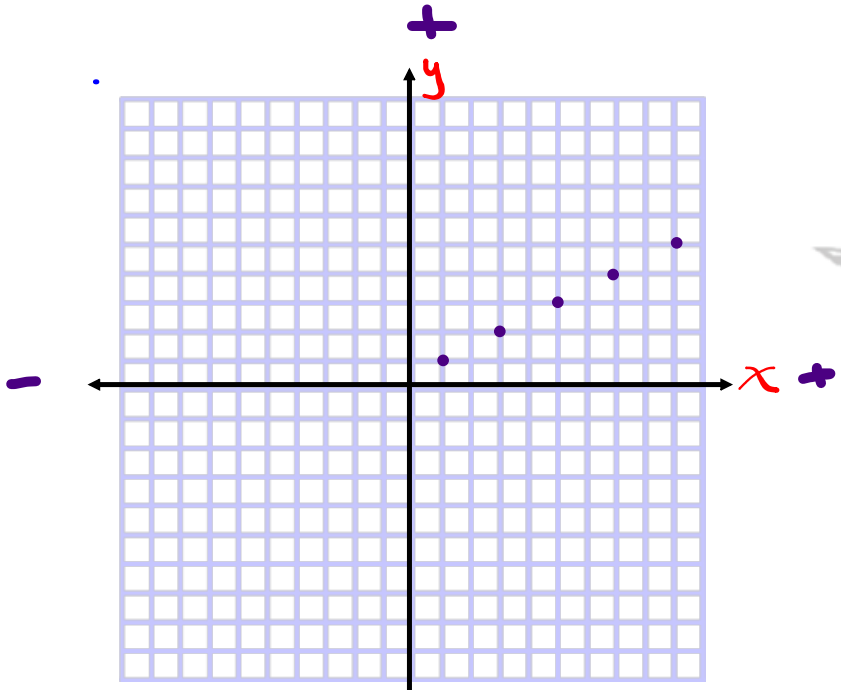
Range

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:

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

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

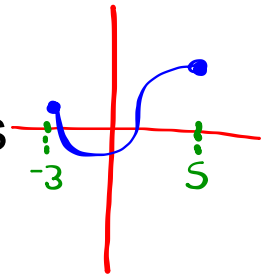
Domain: $\{-3,-2,1,2,5\}$

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

No repeats listed

How do you state the Domain?

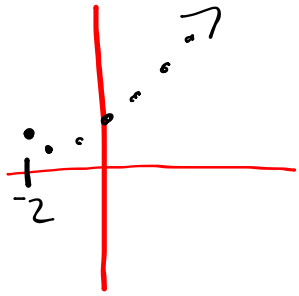
When connected lines



Domain "x" ↔

{x | Smallest left ≤ x ≤ largest right , x ∈ ___}

{x | -3 ≤ x ≤ +5 , x ∈ R}



{x | -2 ≤ x , x ∈ I}

How do you state the range?

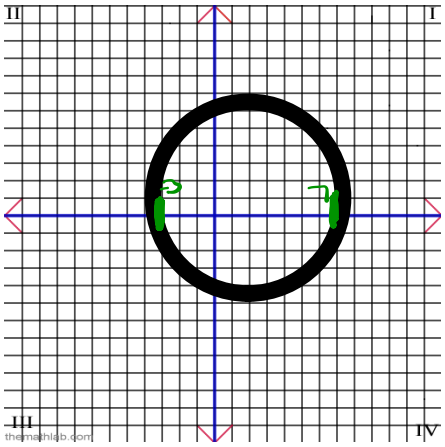
When connected lines

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

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

{y I Lowest ≤ y ≤ Highest , y ∈ __}

Domain

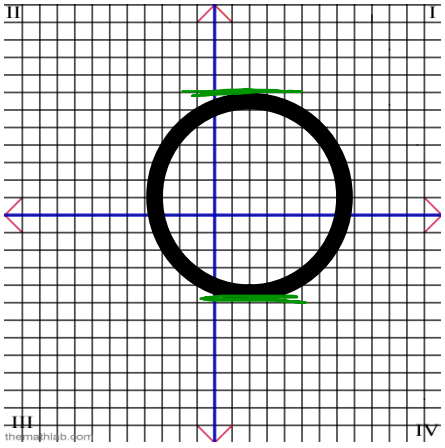


The **domain** represents all the values of x.

X is the independent Variable

$\{x \mid -3 \le x \le +7, x \in R\}$

Range



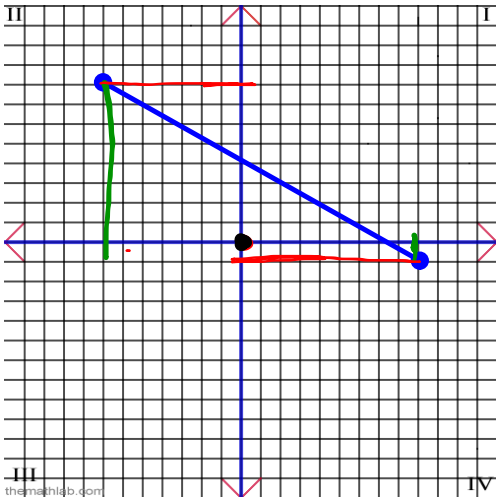
The **range** represents all the values of y.

Y is the dependent Variable

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

EXAMPLES!

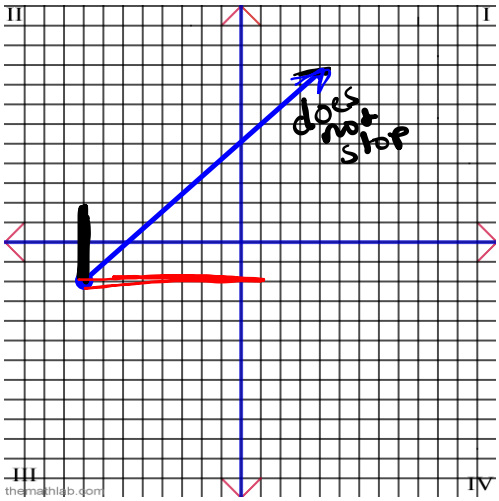
1.



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

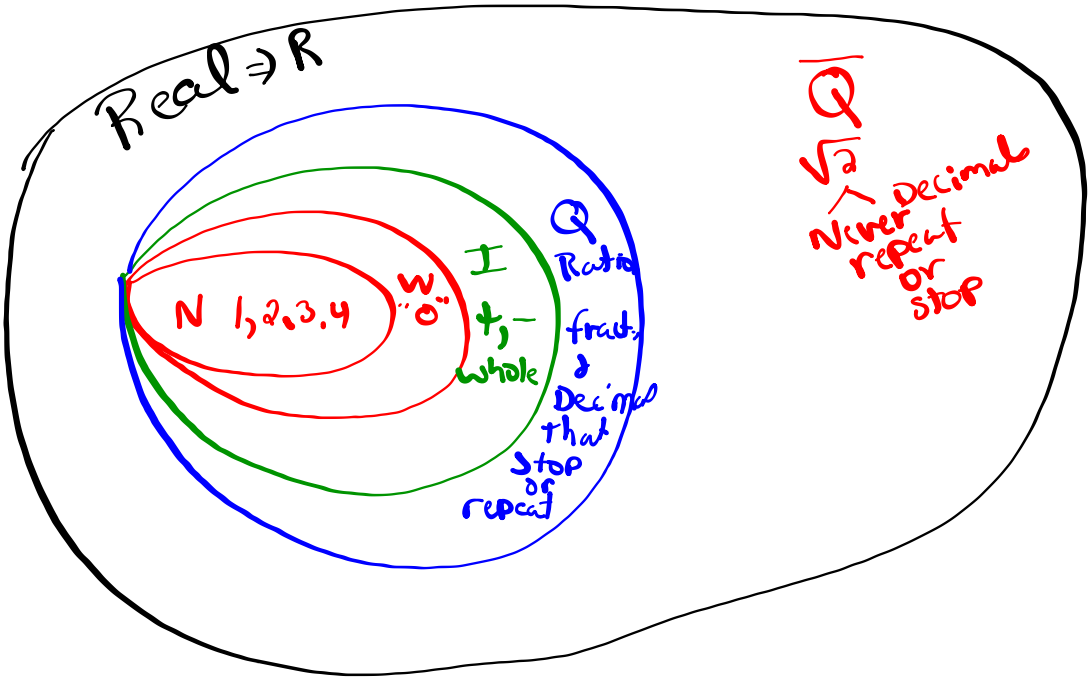
$\{y \mid -1 \le y \le +8, y \in \mathbb{R}\}$

2.



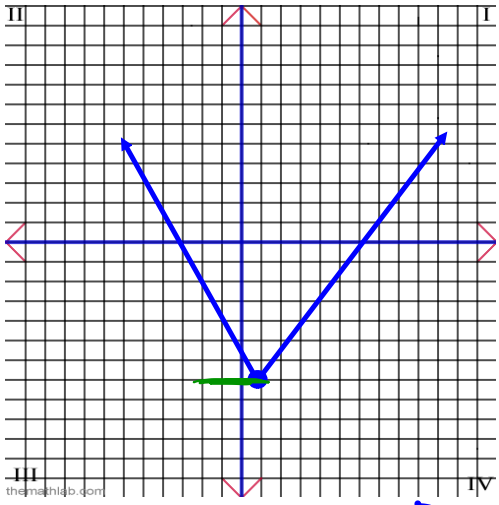
$\{x \mid -8 \le x, x \in \mathbb{R}\}$

$\{y \mid -2 \le y, y \in \mathbb{R}\}$


Real ∋ R
N 1,2,3,4
W "0"
I
+, −
whole
Q
Ratio
fract.
&
Decimal
that
stop
or
repeat
$\overline{Q}$
$\sqrt{2}$
Never Decimal
repeat
or
stop

EXAMPLES!

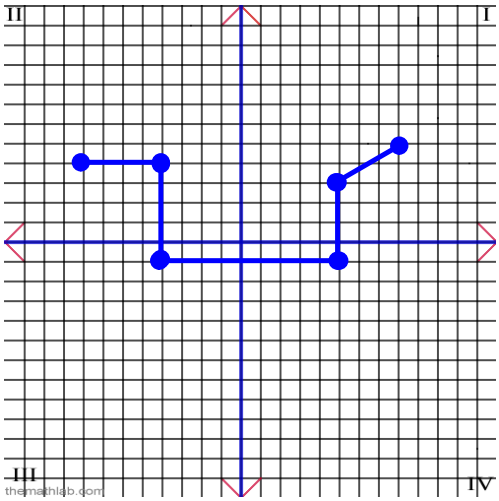
3.



$\{x \mid \quad , x \in \mathbb{R}\}$

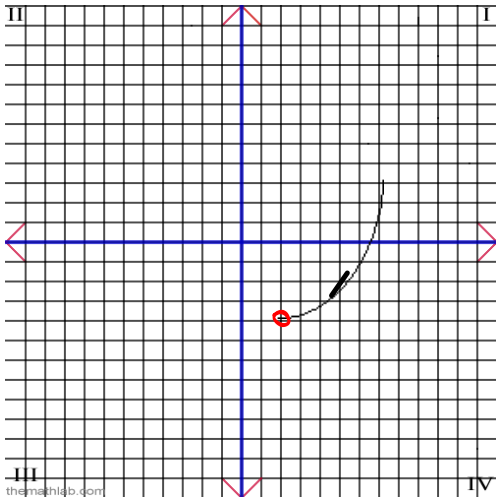
$\{y \mid -7 \le y \quad , y \in \mathbb{R}\}$

4.

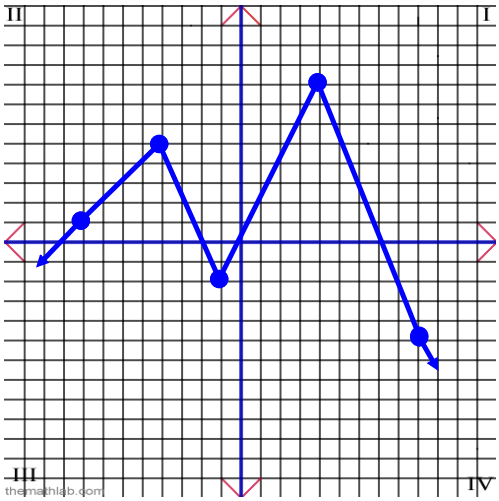


EXAMPLES!

5.

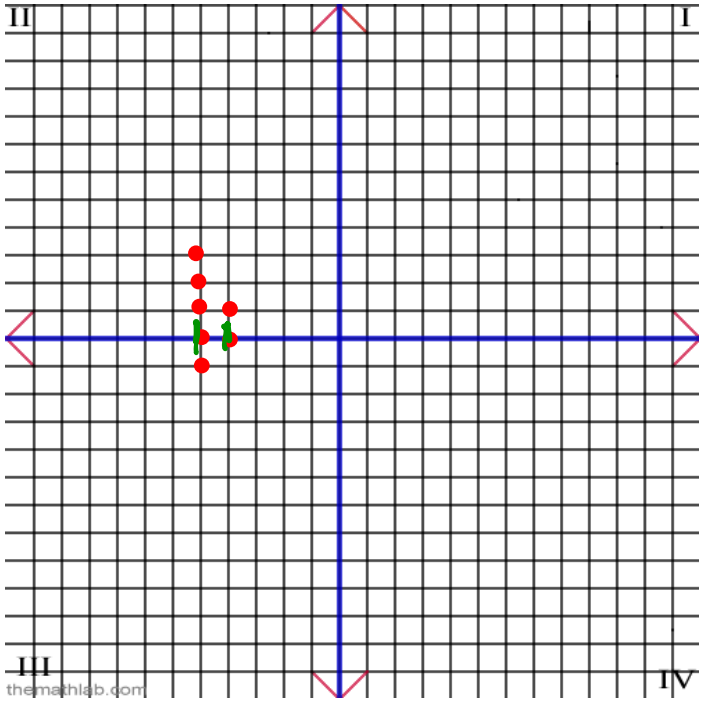


6.



EXAMPLES!

7.



$\{x \mid \underline{-5} \le x \le \underline{-4},\ x \in \underline{I}\}$

$\{y \mid \underline{-1} \le y \le \underline{+3},\ y \in \underline{I}\}$

Homework

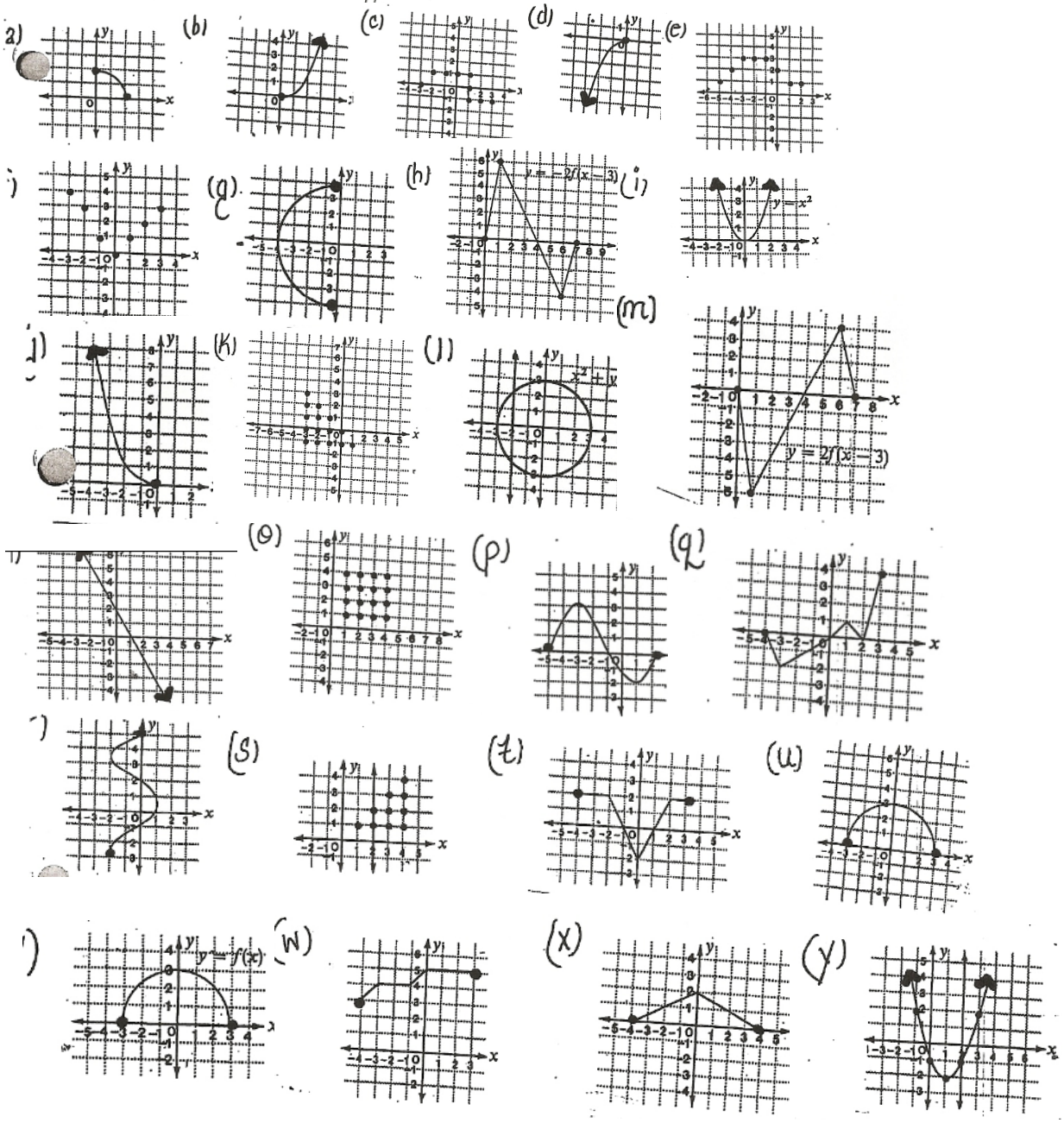
domain and range from graphs (Worksheet 1)

$\{x \mid \_\_ \le x \le \_\_, x \in \_\_\}$

$\{y \mid \_\_ \le y \le \_\_, y \in \_\_\}$

Include =
when solid ●
don't include =
when open circle ○

* State the domain & range for each of the following !!!:B9)



Attachments

Domain & Range 1.doc