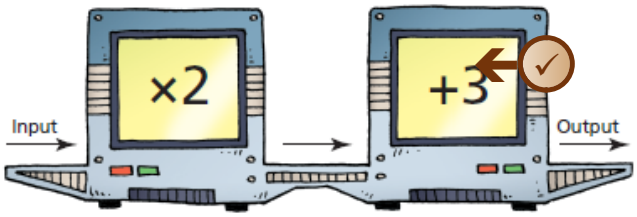
5.2 Properties of Functions

LESSON FOCUS Develop the concept of a function.

Make Connections



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

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

Which numbers would complete this table for the machine?

Remember

Independent / Dependent

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

Complete the chart for y = -2x+5

Slope

Independent x	dependent y
0	5
1	3
2	1
3	-1

-2 -2 -2

Complete the chart for y = 18x

6

hint

x should count by 6

x	y
0	
6	
12	

Same as y = 3x + 4

Write an equation for the chart

Independent Variable

- Hours do not depend on the person's pay.

Dependent Variable

- A person's pay often depends on the number of hours worked.

Indep dependent

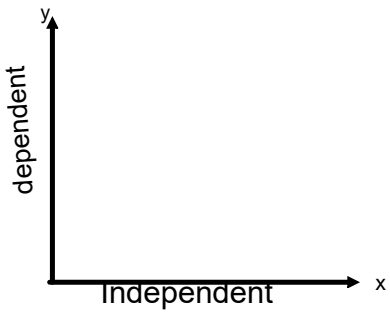
12x + 0

$P = 12h$

Hours Worked, h	Gross Pay, P ($)
1	12
2	24
3	36
4	48
5	60

Δx: +1, +1, +1, +1

Δy: +12



When graphing always

Try This!!

Number of Marbles, n	Mass of Marbles, m (g)
1	1.27
2	2.54
3	3.81
4	5.08
5	6.35
6	7.62

Independent

Dependent

Domain
{1,2,3,4,5,6}

Range
{1.27,2.54,3.81,5.08,6.35,7.62}

a) State the domain & Range.
b) Is this relation a function? (Can't Repeat Domain) Yes
c) State the dependent and independent variables.
d) Write the function notation.

no Repeats then a function

Solution:

a) Domain: { 1, 2, 3, 4, 5 }
Range: {1.75, 3.50, 5.25, 7.00, 8.75 }

b) Function

c) Independent - number of tickets
Dependent - Cost

d) C(n) = 1.75 n

Recall from last day

Domain & Range

Domain - the set of first elements in a relation

Range - the set of second elements in a relation

Indep Domain

dep Rang

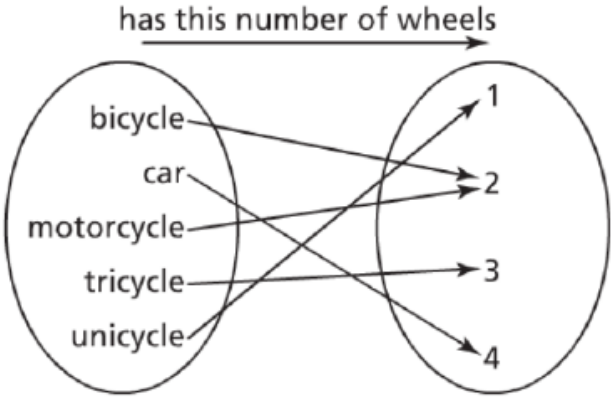
Input	Output
0, 1	3, 5
2	7
3	9
4	11
5	13

+1 +1

2+2

$y = 2x + 3$

Recall from last day

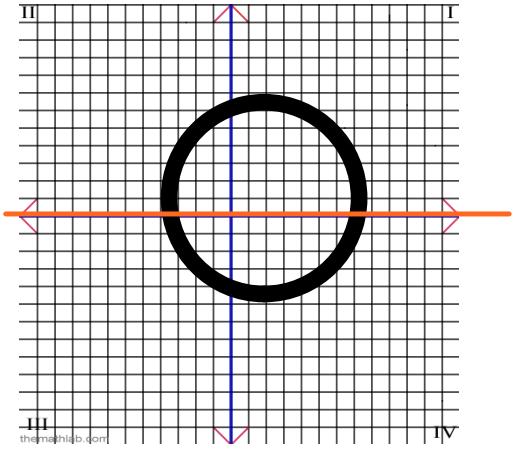


Domain The first set of elements:
{bicycle, car, motorcycle, tricycle, unicycle}

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

Recall from last day

Domain

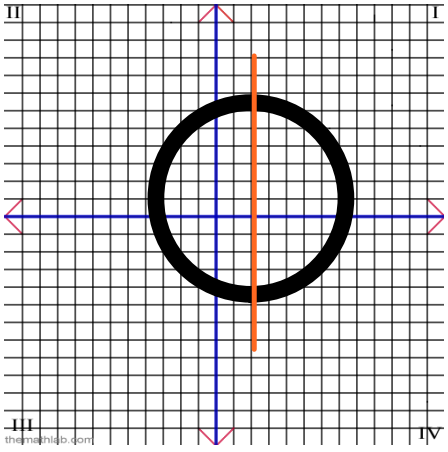


The **domain** represents all the values of x.

X is the independent Variable

Range _____

_____



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

Y is the dependent Variable

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

How do you state the range?

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

such that — Belongs to

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

MATH 10

FUNCTIONS

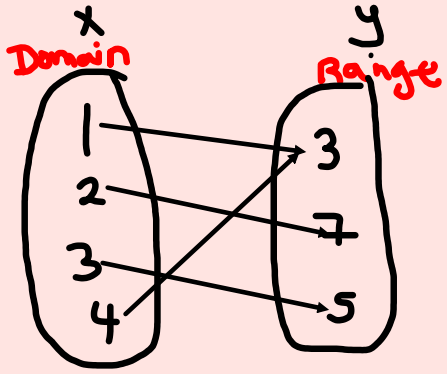
1min

Relations VS Functions

- a relation is where a pattern/relationship exists between the independent variable (x) and the dependent variable(y).

* a function is a special relationship where...
"each x has one and only one y value".

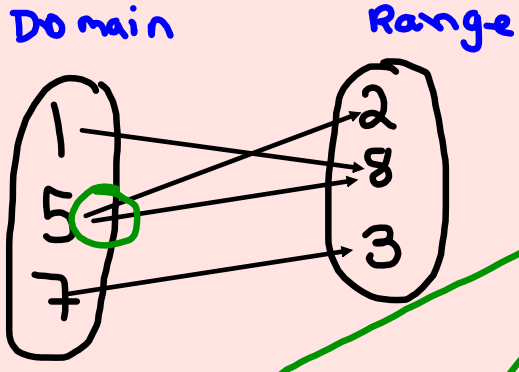
1)



Function
↓
x values are not repeated

{(1, 3), (2, 7), (3, 5), (4, 3)}

2)



Non function

{(1, 8), (5, 2), (5, 8), (7, 3)}

Function or Nonfunction

Function:
A relation where each element in the first set is associated with one and only one element in the second set.

Function

Functions

- How can I tell from a set of points/table?

"an x value has more than one y value"

- a function is a relation in which no two ordered pairs have the same first coordinate.

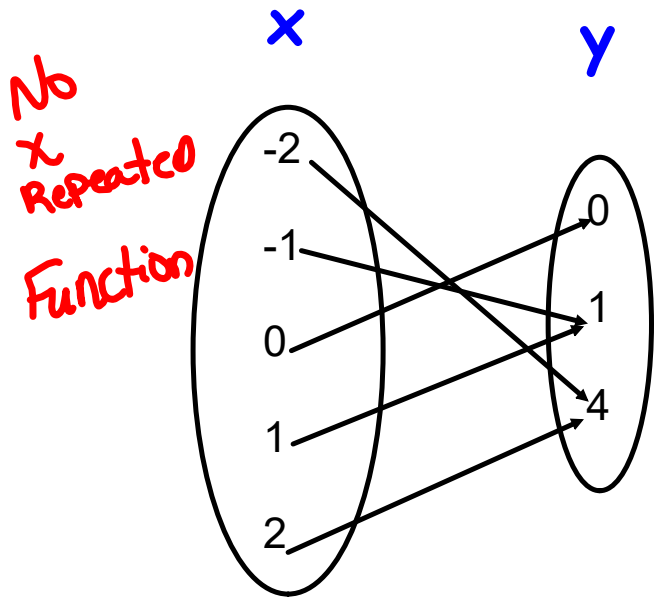
x	y
3	5
7	11
8	15
9	22

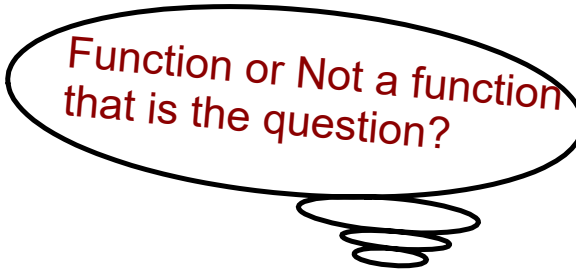
No x repeated

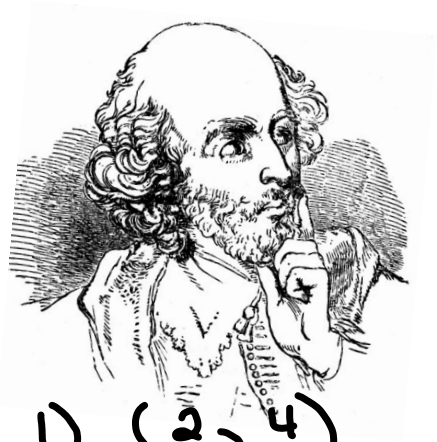
Function or Not a function that is the question?

Arrow Diagrams

Function:
For every first element there is one and only one second element. (Only one arrow starts from each element of the domain.)



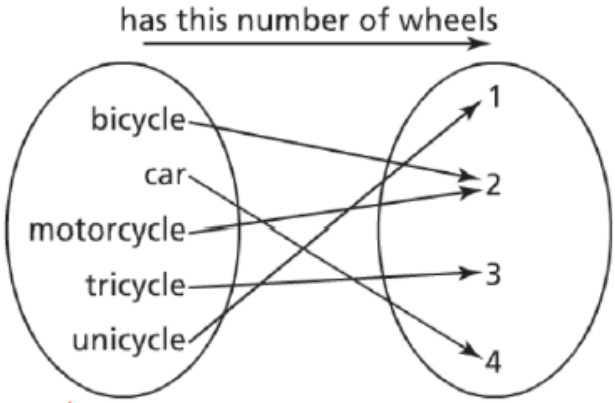




(-2, 4) , (-1, 1) (0, 0) (1, 1) (2, 4)

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

Function or Not a function that is the question?



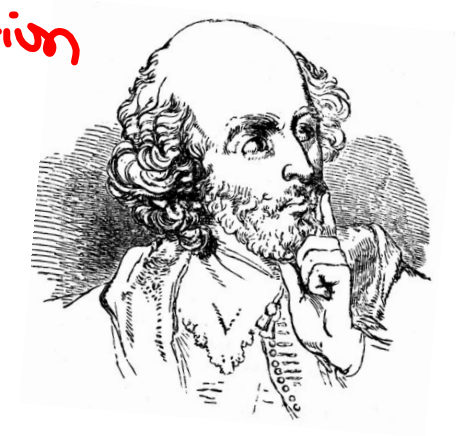
No repeats in x
So function

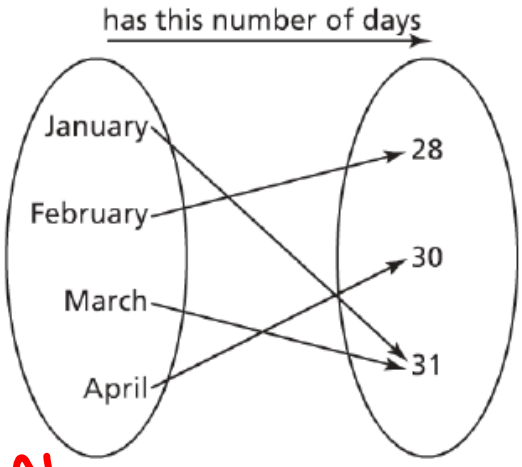
Function or Not a function that is the question?

{ (2, 5), (3,7) , (4, 2) , (2, 6) , (8,0) }

Repeat of x=2 so Not a function

Function or Not a function that is the question?





No repeat in x so function

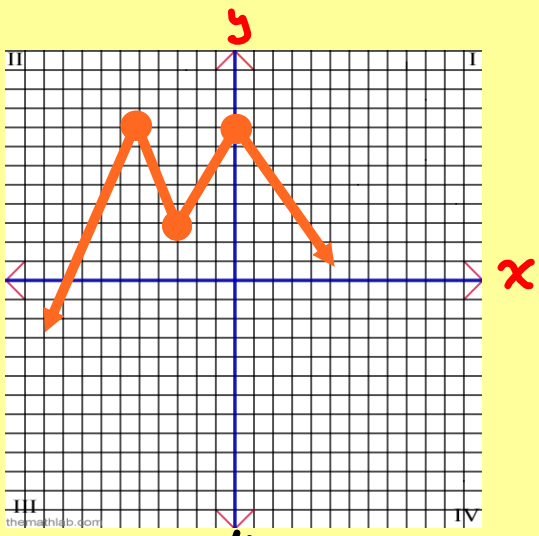
Function or Not a function that is the question?

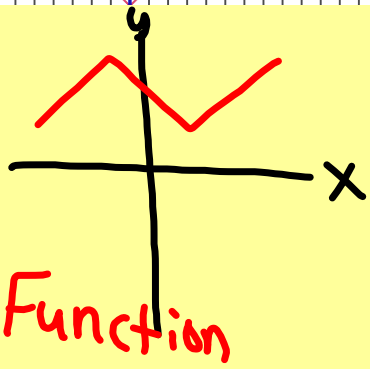
Function or Nonfunction

** To determine whether or not a graph is a function or nonfunction, we use what is called the vertical line test!!

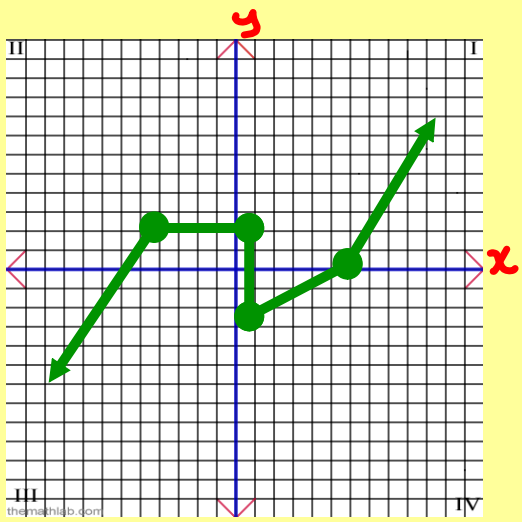
** If the line crosses the graph more than once at any particular location, then it is not a function.

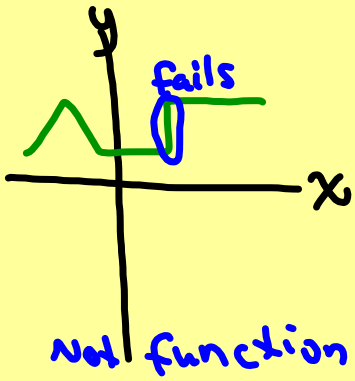
Function



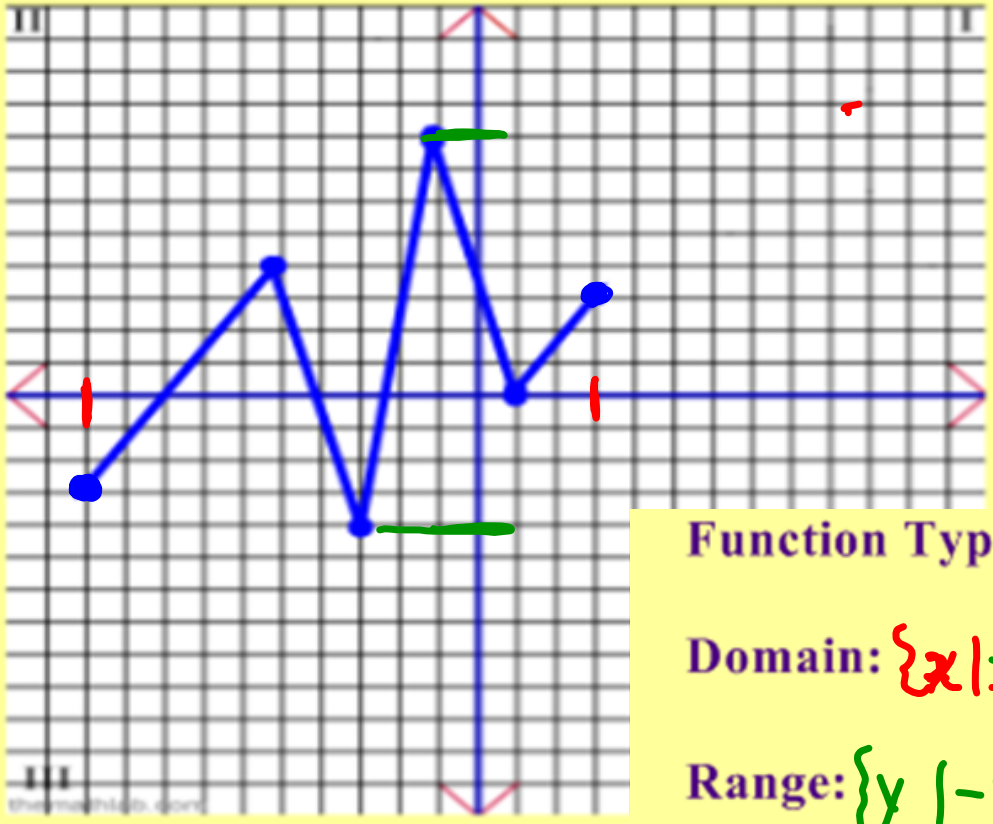


Nonfunction





** State whether the graph is a function or nonfunction, as well as stating the domain & range!!

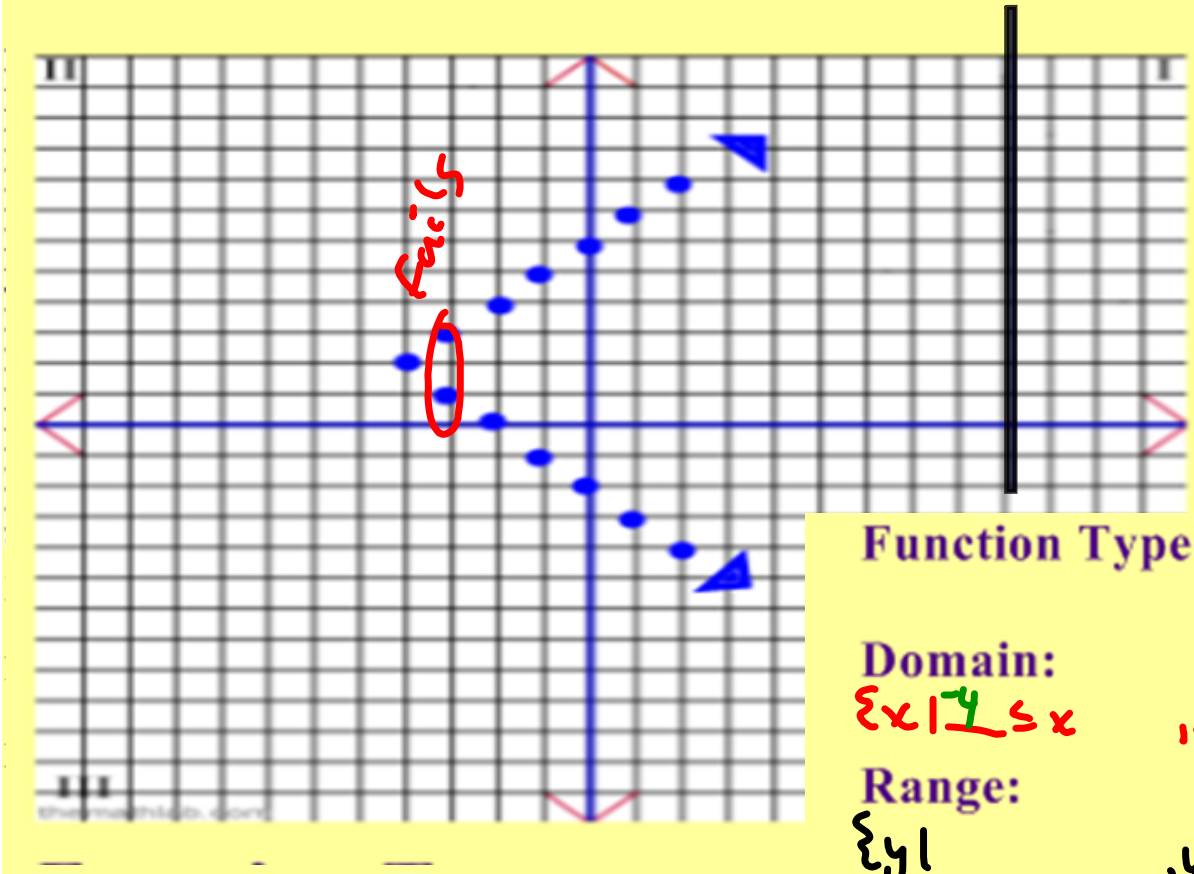


Function Type: Function

Domain: $\{x \mid -10 \le x \le 3, x \in R\}$

Range: $\{y \mid -4 \le y \le 8, y \in R\}$

* State whether the graph is a function or nonfunction, as well as stating the domain & range!!



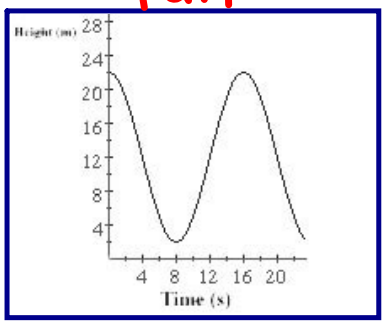
Function Type: Nonfunct

Domain: $\{x \mid y \leq x, x \in I\}$

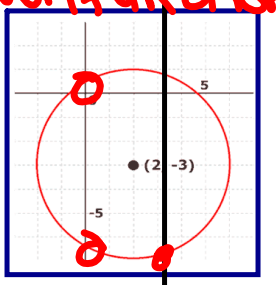
Range: $\{y \mid y \in I\}$

Use the Vertical Line Test to see if the graph is a function

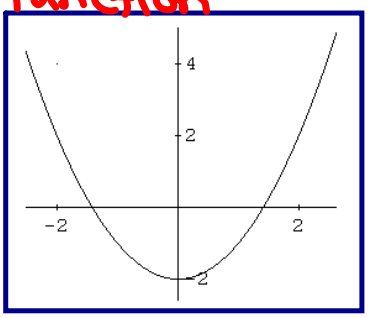
Fun



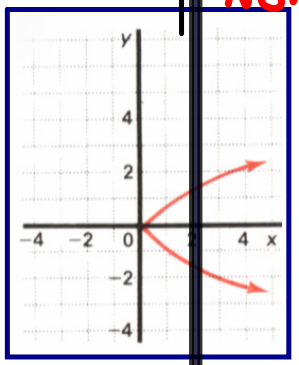
Nonfunction



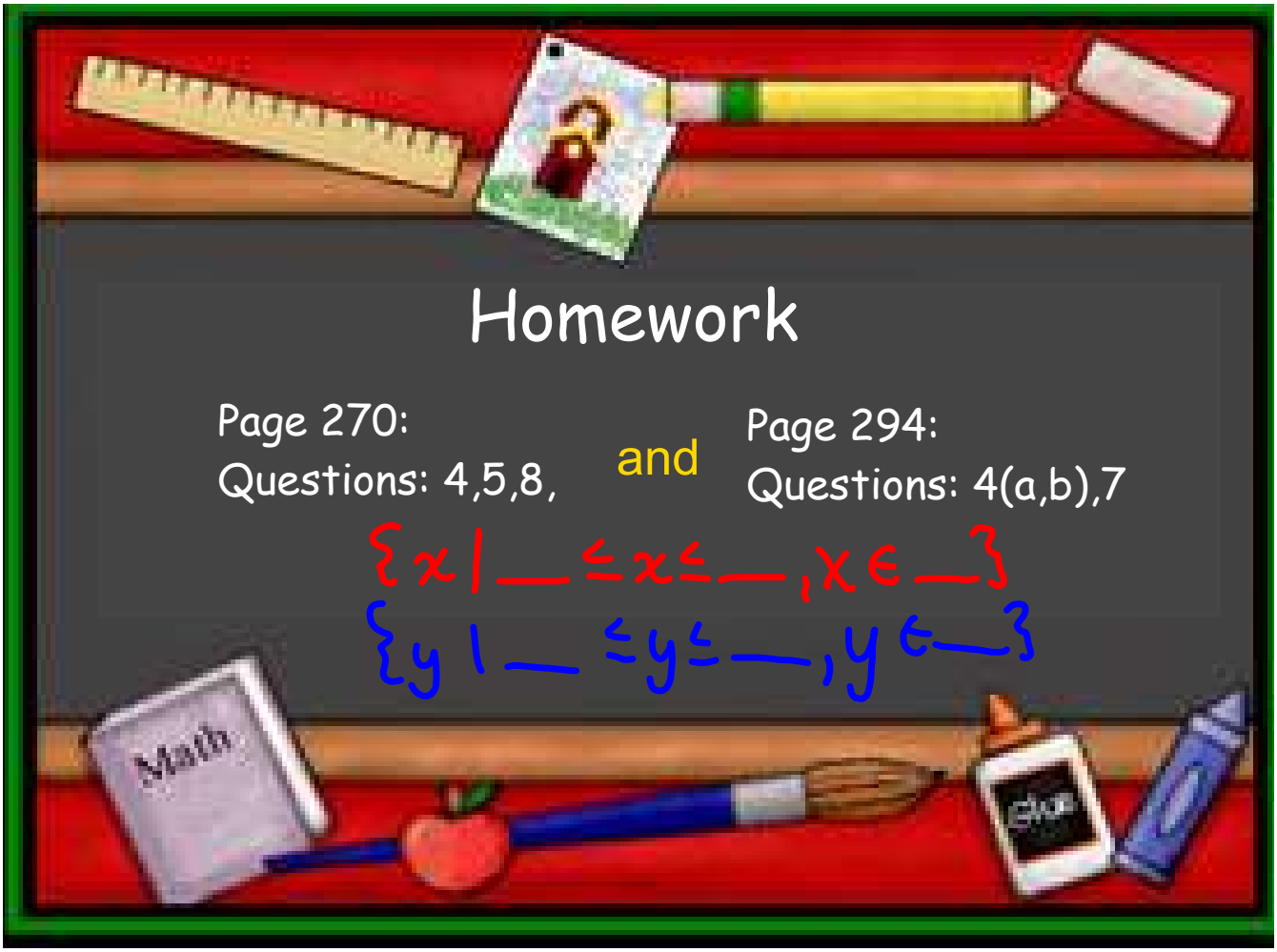
Function



Non function



Graphs are so EASY


Homework
Page 270:
Questions: 4,5,8,
and
Page 294:
Questions: 4(a,b),7
{x | __ ≤ x ≤ __ , x ∈ __}
{y | __ ≤ y ≤ __ , y ∈ __}
Math
Glue