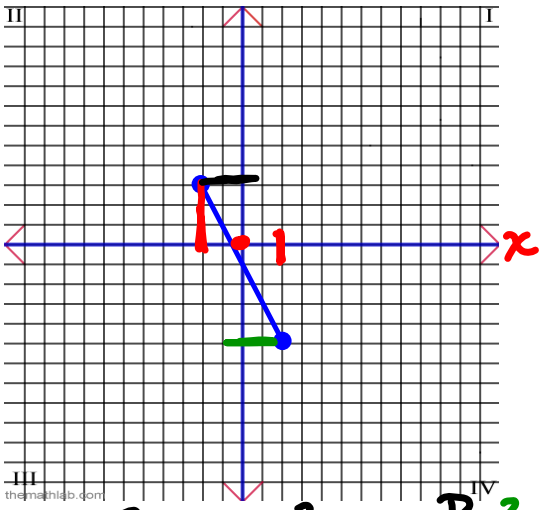
# Warm Up Apr. 12

## State the domain and range

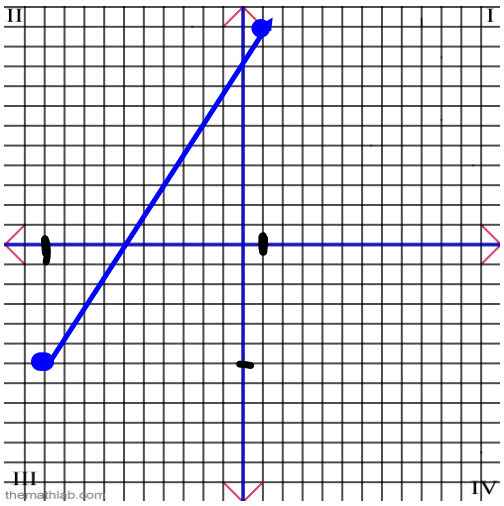
1.




$\{x \mid -2 \le x \le 2, x \in R\}$

$\{y \mid -5 \le y \le 3, y \in R\}$

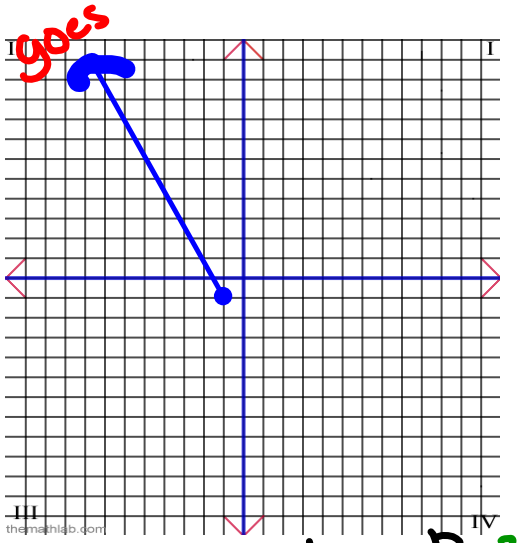
2.




$\{x \mid -10 \le x \le 1, x \in R\}$

$\{y \mid -6 \le y \le 11, y \in R\}$

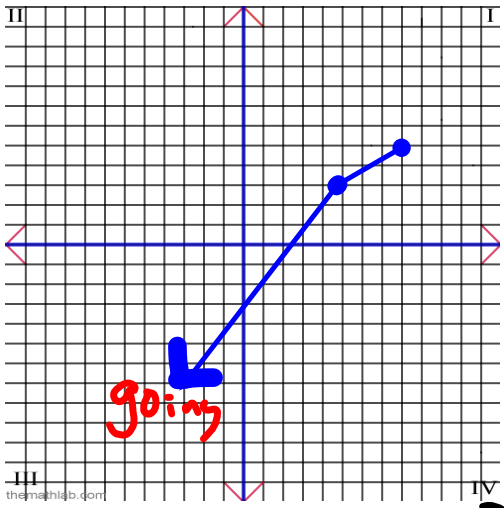
3.




$\{x \mid x \le -1, x \in R\}$

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

4.



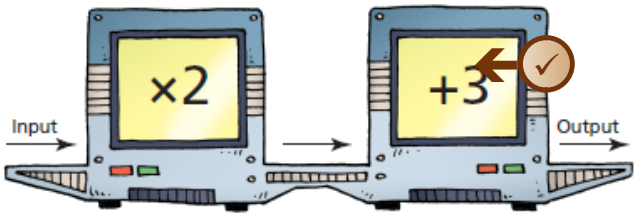

$\{x \mid x \le 8, x \in R\}$

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

# 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

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

Same as y = 3x + 4

# Write an equation for the chart

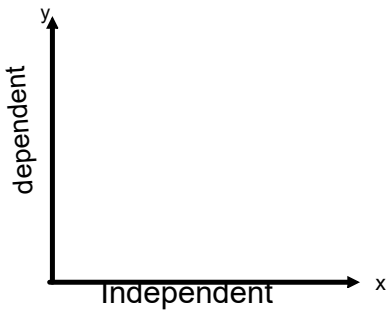
**Independent Variable**

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

**Dependent Variable**

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

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




When graphing always

Try This!!

Independent x

y Dependent

| 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 |

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? Do today

c) State the dependent and independent variables.

y x

d) Write the function notation.

# 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

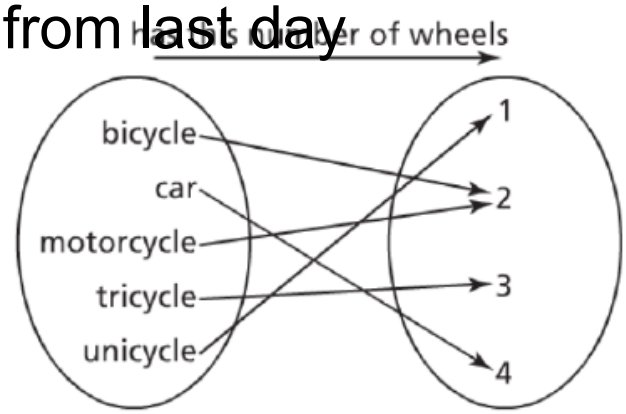
# Domain & Range

**Domain** - the set of first elements in a relation

**Range** - the set of second elements in a relation

| Input | Output |
|---|---|
| 1 | 5 |
| 2 | 7 |
| | 9 |
| 4 | |
| | 13 |

Recall from last day

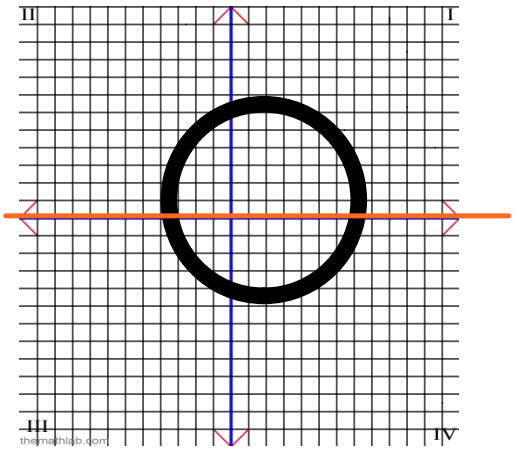



**Domain** The first set of elements:
{bicycle, car, motorcycle, tricycle, unicycle}

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

Recall from last day

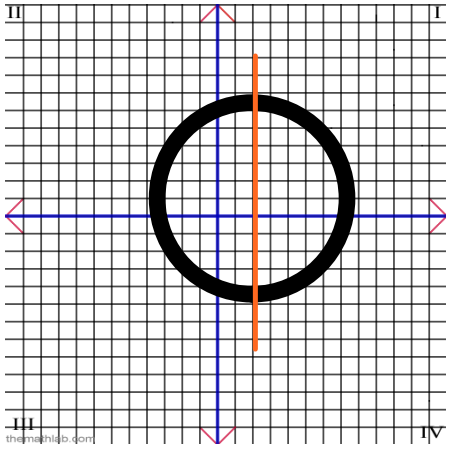
Domain




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**

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

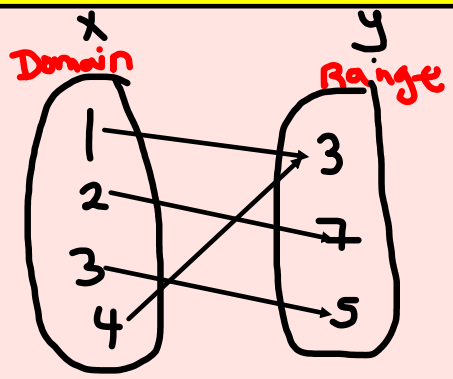
1min

# 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".
  (Y can repeat but x cannot)

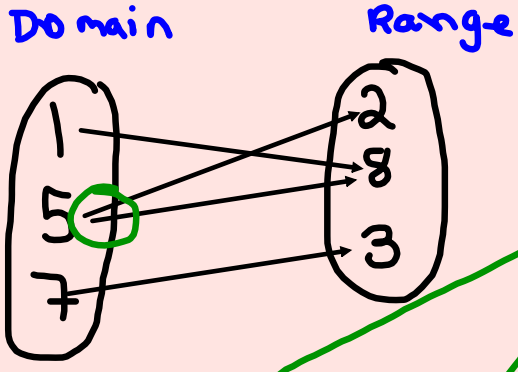
1)




Function
↓
x values are not repeated

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

2)



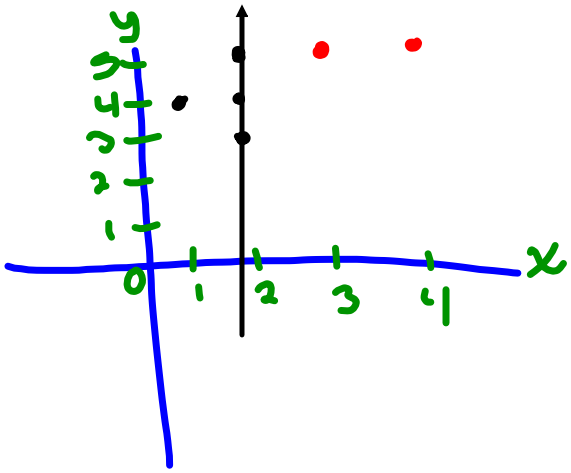

Non function

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

(1,4)
(2,3)
(2,4)
(2,5)
(3,5)
(4,5)

points

$x = 2$ is repeat



# 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

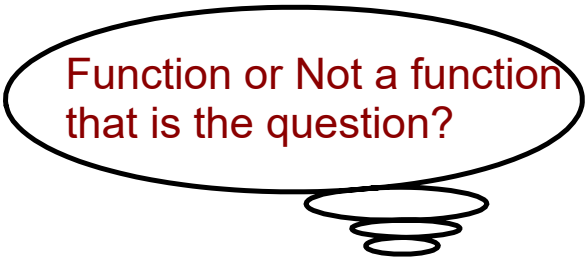
- How can I tell from a set of points/table?

"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.

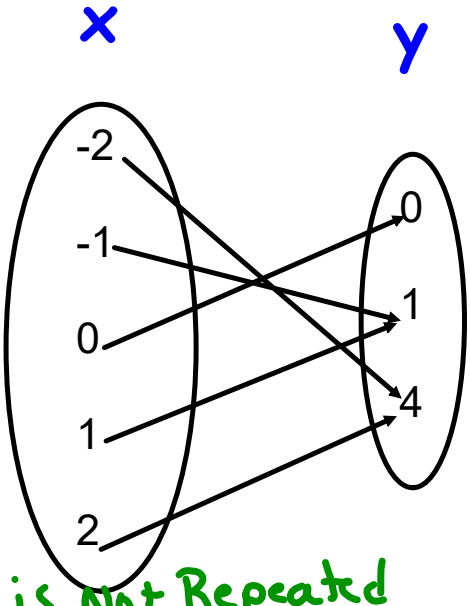
| x | y |
|---|---|
| 3 | 5 |
| 7 | 11 |
| 8 | 15 |
| 9 | 22 |

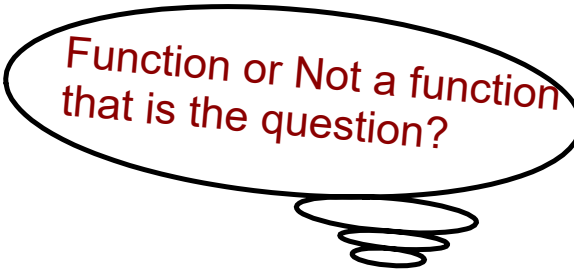
X Not Repeated
So a function




# 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.)



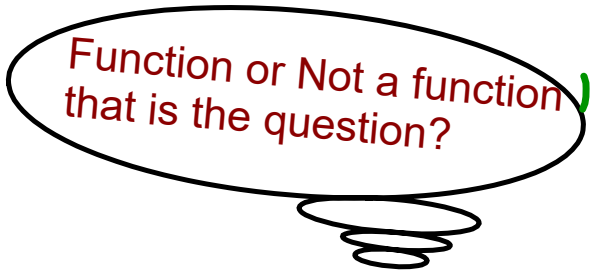

X is Not Repeated
So a function

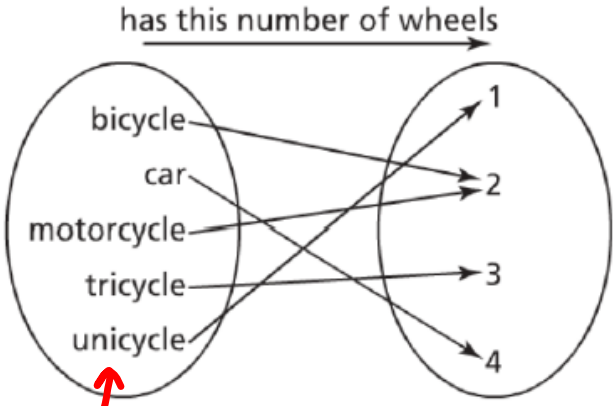
(-2, 4) , (-1, 1) (0, 0) ( 1, 1) ( 2, 4)

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

"x" is repeation

So NOT a function




No repeats
So A function

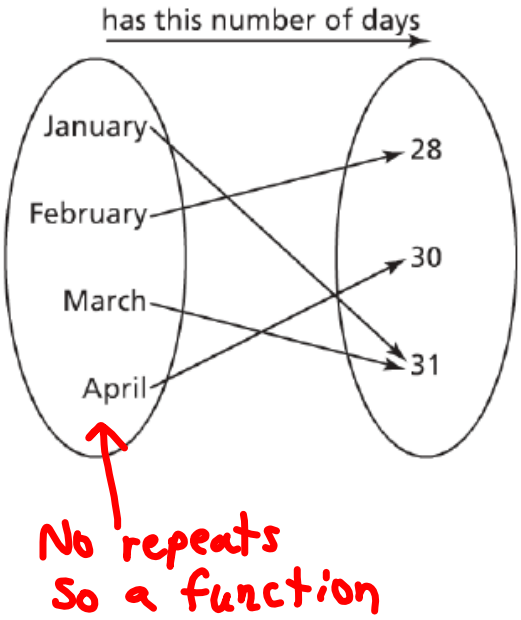
Function or Not a function
that is the question?

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

$x = 2$ is repeated

so NOT a function

Function or Not a function that is the question?




No repeats
So a function

Function or Not a function that is the question?

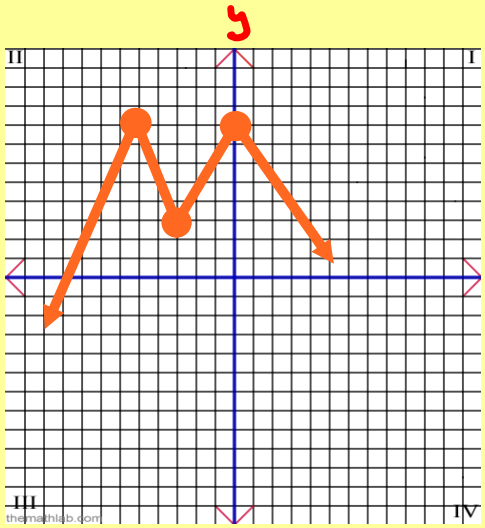
# Function or Nonfunction

** 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.

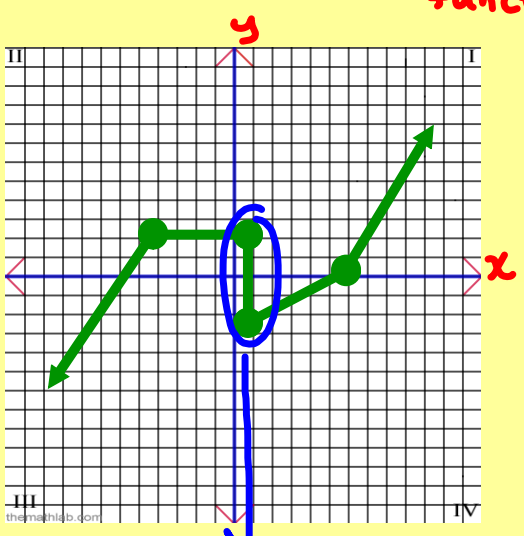
A vertical line test is used to see if a graph is a function

**Function**



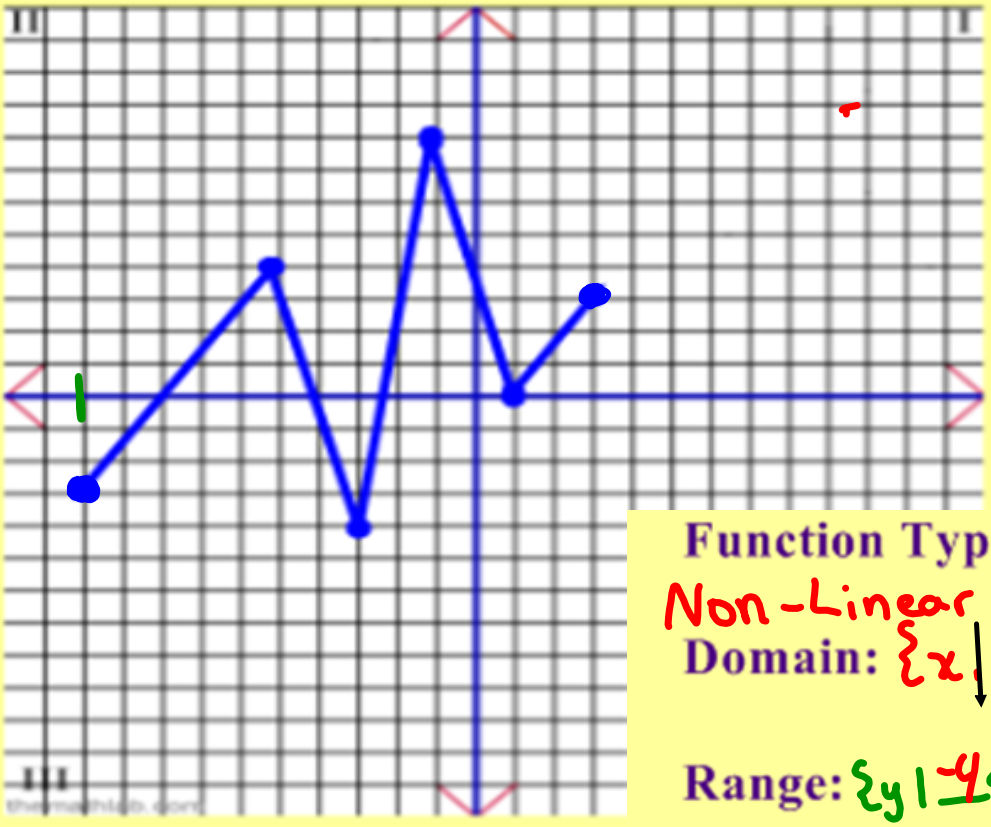

Function

**Nonfunction**




Fails Vertical Line test
Not a function

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



Function Type: Function

Non-Linear

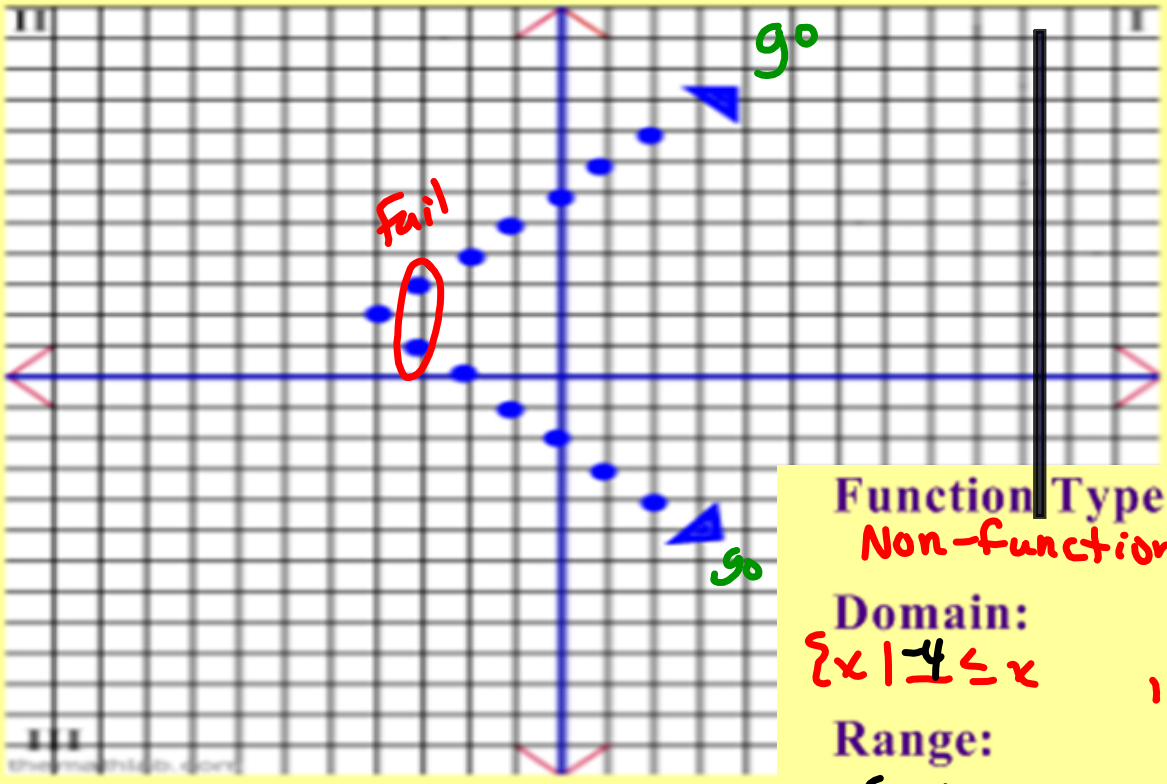
Domain: $\{x \mid -10 \le x \le 3, x \in R\}$

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

To determine if a graph is Linear, look to see if it is a Single Straight line

... or / (Not or)

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



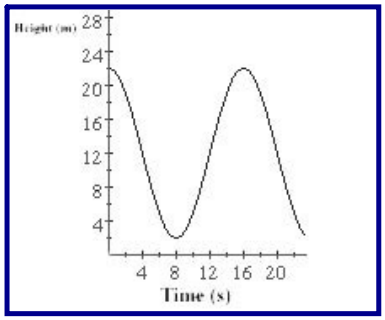

Function Type:
Non-function

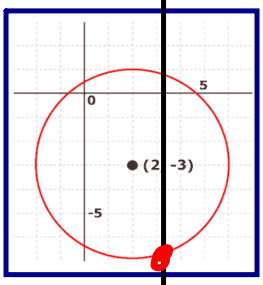
Domain:
$\{x \mid -4 \leq x \quad , x \in I\}$

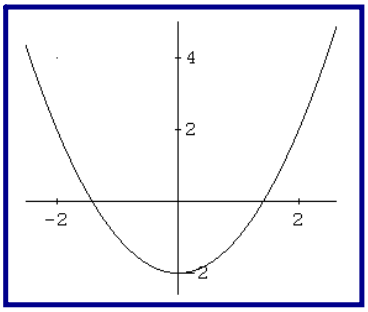
Range:
$\{y \mid \quad , y \in I\}$

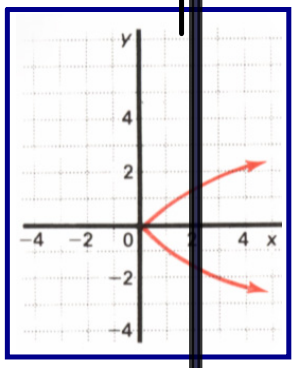
Non-linear
(not 1 straight line)

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

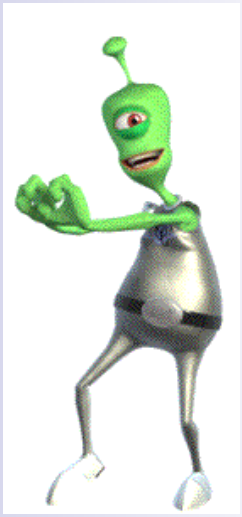


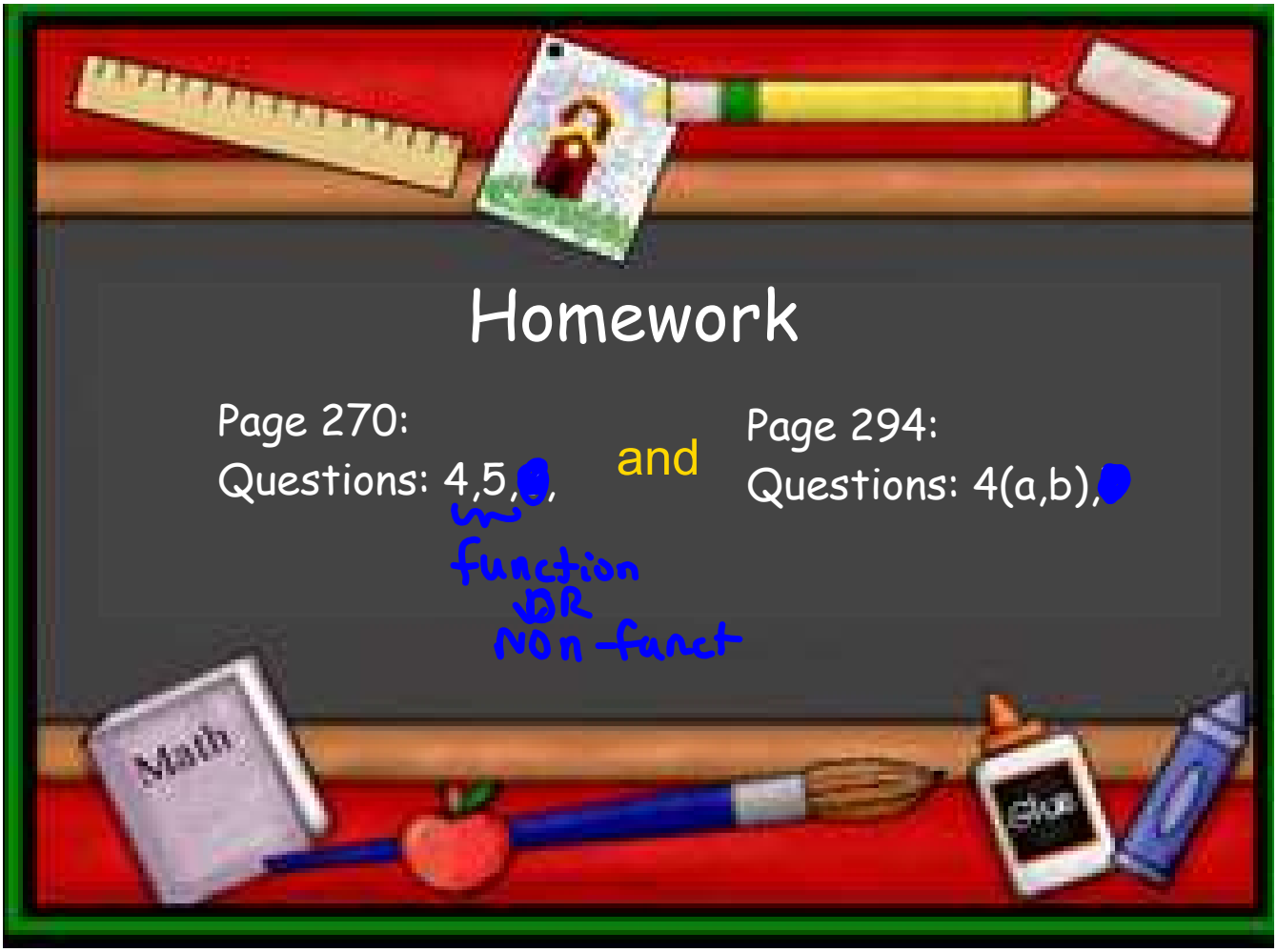



Graphs are so EASY




Homework
Page 270:
Questions: 4,5,6,
and
Page 294:
Questions: 4(a,b),
function
OR
Non-funct
Math
Glue