

VIDEO 1: Relations

A \_\_\_\_\_ is a set of \_\_\_\_\_.

For example, the following set of ordered pairs shows the relation between number of chocolates in a box and the price of that box.

(6, 8), (12, 12), (18, 15), (24, 18).

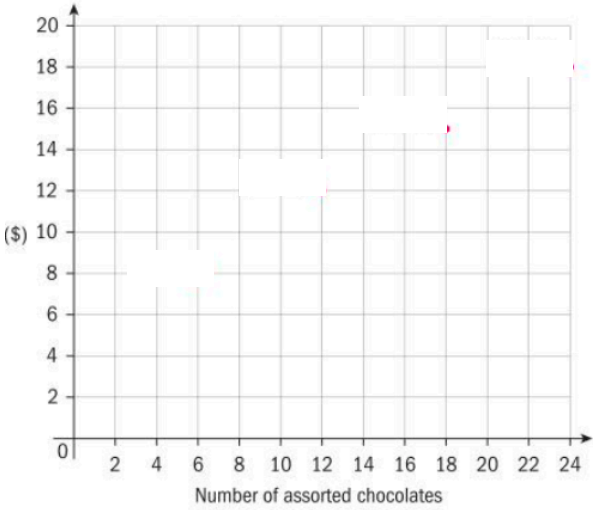
Relations can also be represented in \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

Using the ordered pairs above, complete each representation of the relation given above.

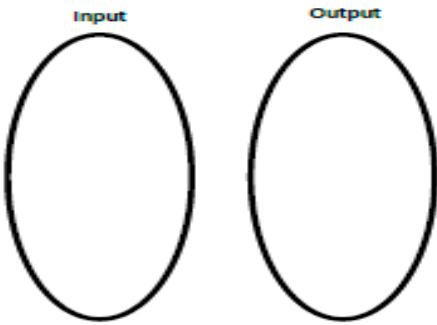
Table

Number of assorted chocolates	Price of chocolate box (\$)

Graph



Mapping Diagram



Equation

Paula is working on an environmental project and is analysing the amount of paper used to print some books. She finds out that to print one copy of a certain book 6 m<sup>2</sup> of a particular type of paper is needed.

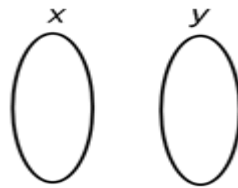
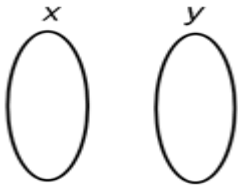
Let  $A$  be the set of the number of copies of the book,  $\{1, 2, 3, 4, 5\}$ , and  $B$  the set of the amount in m<sup>2</sup> of the paper needed to print that number of copies,  $\{6, 12, 18, m, n\}$ .

- a Find the values of  $m$  and  $n$ .
- b Write down the set of ordered pairs for this relation.
- c Draw a mapping diagram for the set of ordered pairs.

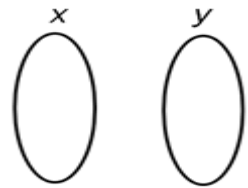
## Function:

A specific type of relation where every \_\_\_\_\_ of the first set (\_\_\_\_\_, \_\_\_\_\_) is \_\_\_\_\_ onto \_\_\_\_\_ element of the second set (\_\_\_\_\_, \_\_\_\_\_).

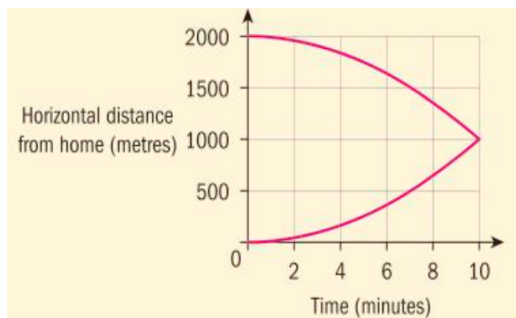
Function



Not a Function

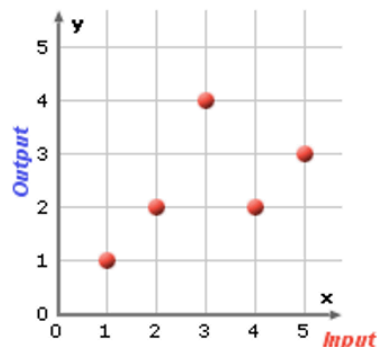
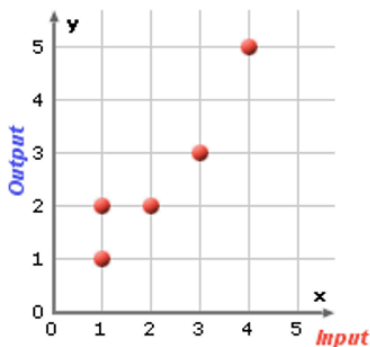


Why is this graphed relation not a function ?



## Vertical Line Test

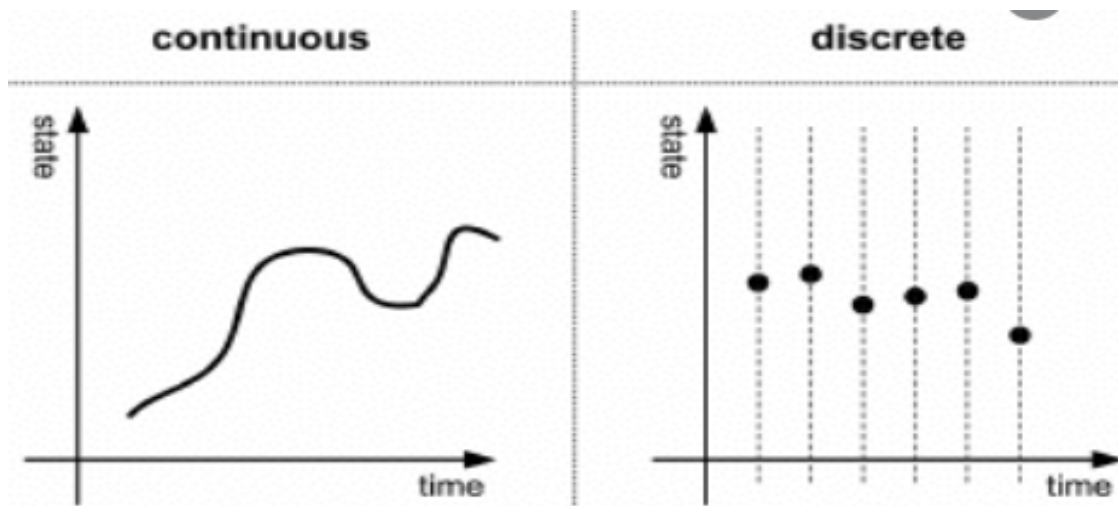
For Graphs of relations – use the VERTICAL LINE TEST  
→ if it 'hits' more than once, it is NOT a function



## VIDEO 2:

Domain:

Range:



| What is the smallest x-value?

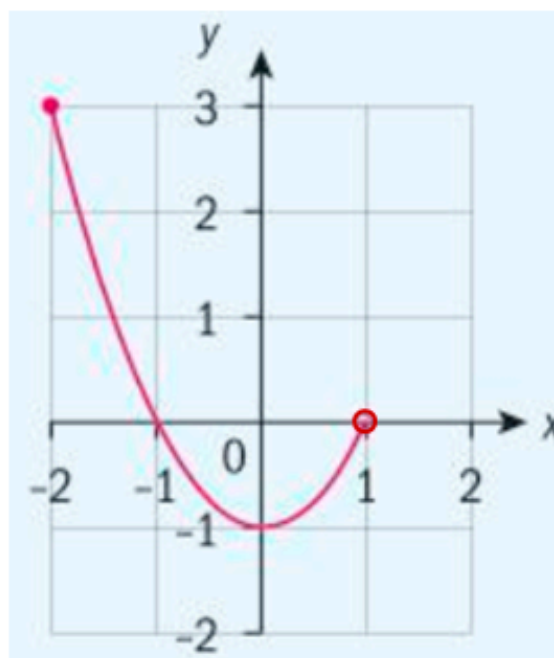
| What is the largest x-value?

Write the **domain**.

| What is the smallest y-value?

| What is the largest y-value?

Write the **range**.



What is the smallest x-value?

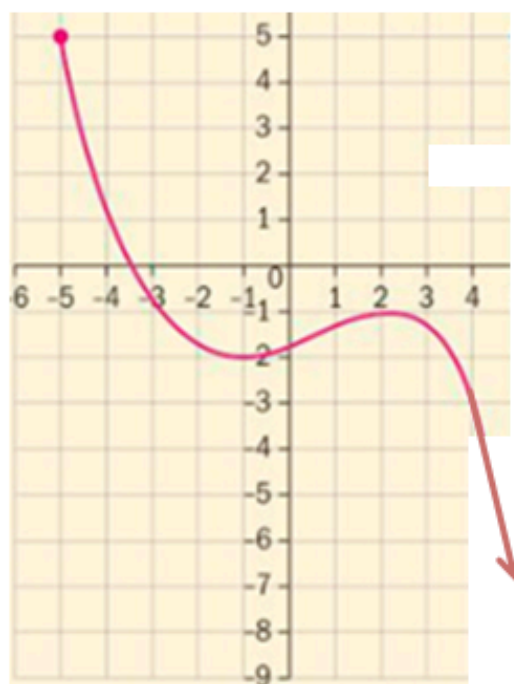
What is the largest x-value?

Write the **domain**.

What is the smallest y-value?

What is the largest y-value?

Write the **range**.



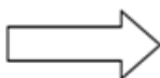
- 1** Consider the function  $y = x + 1$ , where  $-2 \leq x \leq 1$ .
  - a** Find the image of  $x = -0.5$ .
  - b** Write down the domain.
  - c** Use your GDC to help you sketch the graph of this function.
  - d** Hence, find the range of this function.

## VIDEO 3: Functions Notation and Linear Models

Example: Evaluate when  $x = 5$ .

x-y Notation

$$y = 4x - 7$$



Function Notation

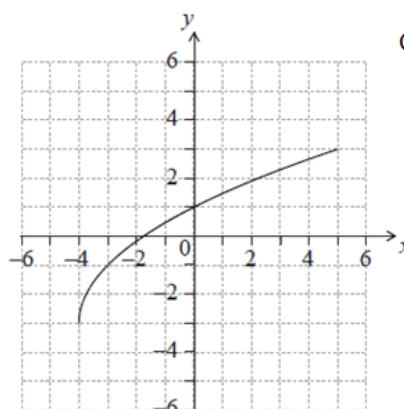


Find each value:

$$f(2) =$$

$$f(3) =$$

$$\text{If } f(x) = 1, \text{ then } x = \underline{\hspace{1cm}}$$



Given the graph of  $g(x)$ .

$$g(2) =$$

$$g(-1) =$$

$$\text{If } g(x) = -1, \text{ then } x =$$

Consider the function  $f(x) = x^2 + 1$ .

- a** Find the value of  $f(2)$ .
- b** Find the image of  $x = -1$ .
- c** Determine whether the point  $(5, 26)$  lies on the graph of the function  $f$ .

- If  $y = f(x)$  then  $x$  is said to be the independent variable and  $y$  is the dependent variable.
- Different variables and names can be used for functions, such as  $d = v(t)$ ,  $m = C(n)$ , etc.

Relation	Dependent Variable	Independent Variable	Function Notation
Money made ( $m$ ) and shoes sold ( $s$ )			
Hours spent studying ( $h$ ) and marks ( $m$ )			
Ozone layer depth ( $o$ ) and skin cancer cases ( $s$ )			
Number of college courses completed ( $c$ ) and the salary a person makes ( $s$ )			

The price, in dollars, of a motorcycle  $t$  years after purchase is modelled by  $P(t) = 15\,000 - 2500t$ ,  $0 \leq t \leq 6$ .

- State the independent variable and the dependent variable.
- Find the value of  $P(0)$ . State the meaning of  $P(0)$  in this context.

- Find the price of the motorcycle 1.5 years after purchase.
- Find the value of  $t$  for which  $P(t) = 6250$ . Interpret this value of  $t$ .

- Comment on the case  $t = 6$ .
- Sketch the graph of this function.