

Relations vs. Functions

Relation: a relationship between _____ set of _____
- can be expressed as a _____, _____, _____

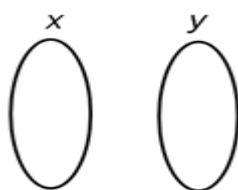
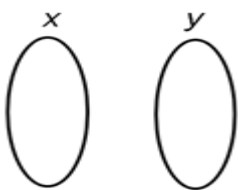
Domain: the set of _____ values (the _____ values)

Range: the set of _____ values (the _____ values)

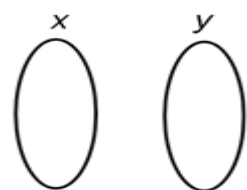
Function:

A specific type of relation where there is _____ for each _____.

Function



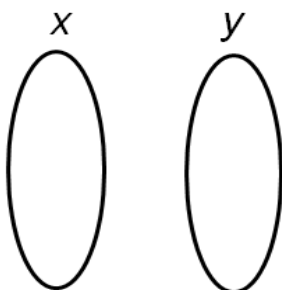
Not a Function



Given the relation: $y = x + 2$

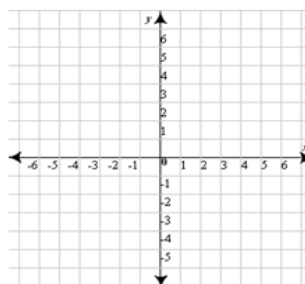
Domain: x is an element of the set $\{0, 1, 2, 3, 4, 5\}$

Range: y is an element of the set



Mapping Diagram

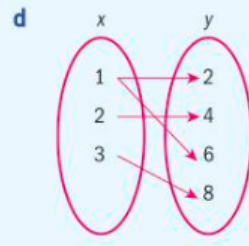
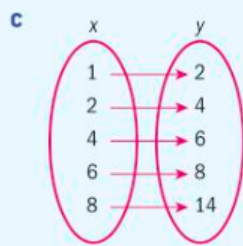
Ordered pairs:



Determine whether each relation below is a function or not.

a $\{(6, 12), (8, 16), (10, 20), (12, 24)\}$

b $\{(5, 20), (5, 25), (10, 40), (10, 100)\}$



e $y = -3x + 7$

f $y = \sqrt{x}$

Investigation 2

Functions can be expressed in words. For example:

Every number from 1 to 6 maps to three times itself.

1 Express this function as:

- i a set of ordered pairs
- ii a table of values
- iii a mapping diagram

2 For each of the representations above, describe how you can tell whether they are a function or not.

Here is another function in words:

Every real number maps to its square.

3 Try to express this as a set of ordered pairs. Explain why this is difficult.

4 Express this function as an equation.

The "Handshake" Problem

# of People n	# of Handshakes $H(n)$
2	1
3	3
4	
5	
6	

First Person Shakes	Second Person Shakes	Third Person Shakes	Fourth Person Shakes
1			
2	1		

Create a function (as an equation) for the number of handshakes in terms of people, n .

Investigation 3

Look at the graphs below:

Function

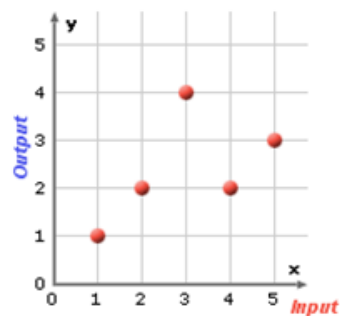
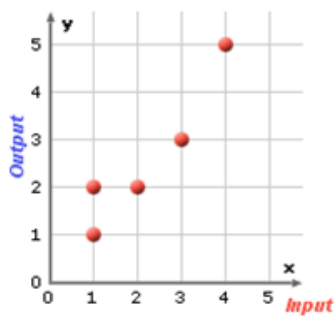
Not a function

Not a function

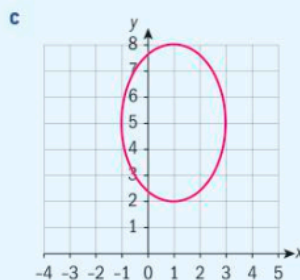
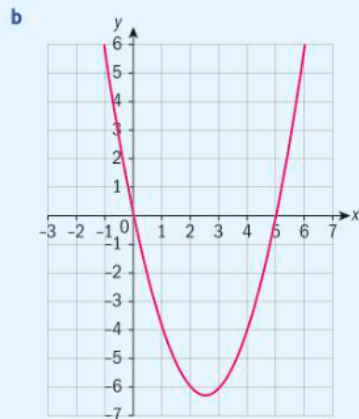
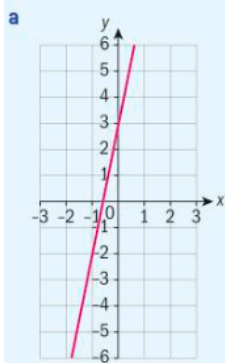
- 1 Hypothesize why the second and third graphs are not functions.
- 2 We use the **vertical line test** to determine whether a graph is of a function. Using the diagrams above and what you know about the definition of a function, explain the vertical line test.

Vertical Line Test

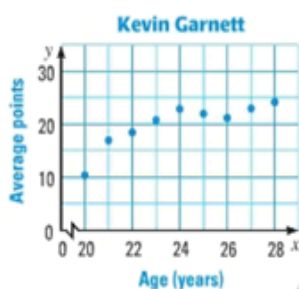
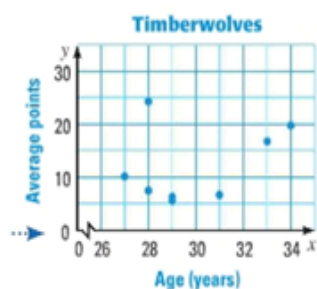
For Graphs of relations – use the _____ LINE TEST
 → if it 'hits' _____, then _____



Determine whether each relation below is a function or not:



DISCUSS:



1. What does the first graph represent?

2. What does the second graph represent?

3. Which graph is a function?
Describe why this data MUST BE a function.

4. Which graph is NOT a function?
Describe why this data cannot be a function.

PRACTICE

Use the given ordered pairs to complete the table, graph, and mapping diagram.

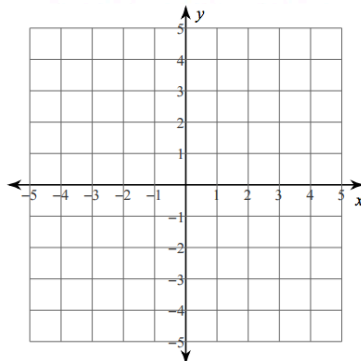
Ordered Pairs

$(-2, 2)$
 $(-2, -2)$
 $(0, 1)$
 $(3, 1)$

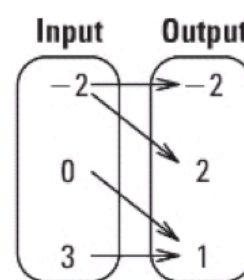
Table

x	y
-2	2
-2	-2
0	1
3	1

Graph

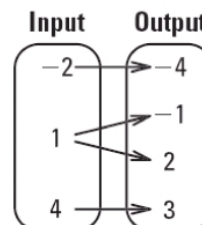
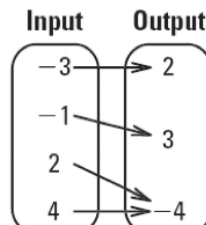
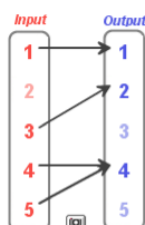
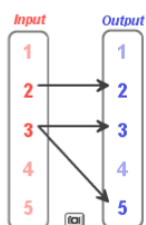


Mapping Diagram



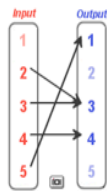
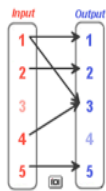
Is this relation a function? Justify your answer.

Is each mapped relation a function? Justify your answer.



Tell whether each relation below is ALSO a function. If NOT, show why.

Mapping Diagrams:



Ordered Pairs:

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

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

Vertical Line Test: used to check if a graphed relation is a function or not

Tell whether each relation below is ALSO a function. If NOT, show why with a vertical line.

