

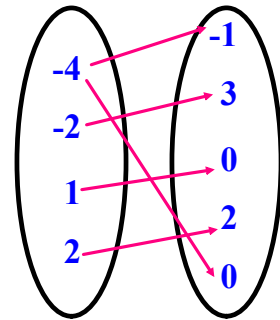
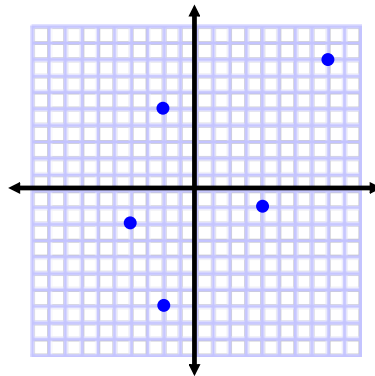
## 2.1 Introduction to Functions

A RELATION is a set of ordered pairs.

Relations can be shown...

- Using braces.  $\{(-4,-1),(-2,3),(1,0),(2,2),(-2,0)\}$
- Using tables.
- Using graphs.
- Using mappings.

x	y
-4	-1
-2	3
1	0
2	2
-2	0



The DOMAIN is the set of all possible values of the first variable (*independent variable*).

The RANGE is the set of all possible values of the second variable (*dependent variable*).

A FUNCTION is a relation such that each value of the domain is paired with *exactly one value* of the range.

In other words...the domain CANNOT repeat!

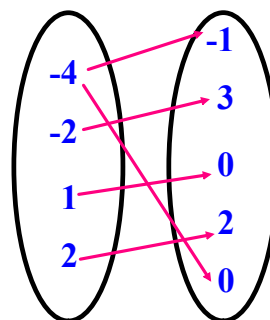
A LINEAR FUNCTION is the graph of a line.

It is in the form of  $y = mx + b$ .

## ARE THE FOLLOWING FUNCTIONS?

1.  $\{(1,3), (2,5), (3,4), (5,6)\}$

2.



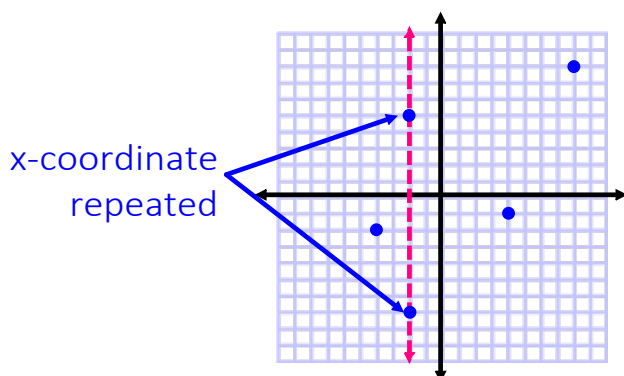
3.  $\{(-1,1), (0,3), (2,3), (-1,4)\}$

4.

x	y
-4	-1
-2	3
1	0
2	2
-2	0

To determine if a graph is a function, use the vertical line test (VLT).

If a vertical line passes through more than one point on the graph of a relation, then the relation is **NOT** a function.

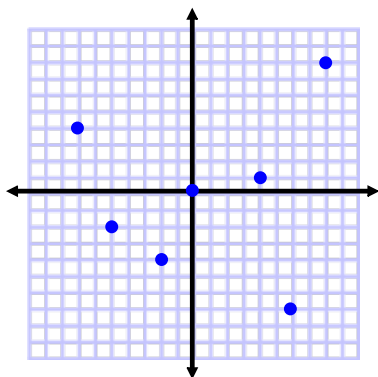


More VLT  
Examples

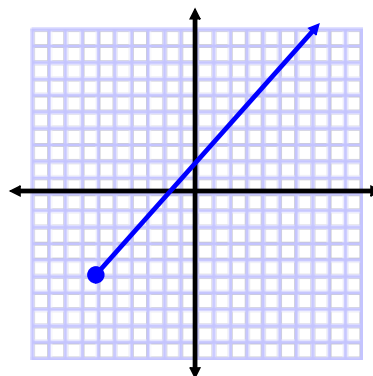
Using VLT  
Worksheet

Determine if each graph is a function.  
Then state the domain and range of each.

5.

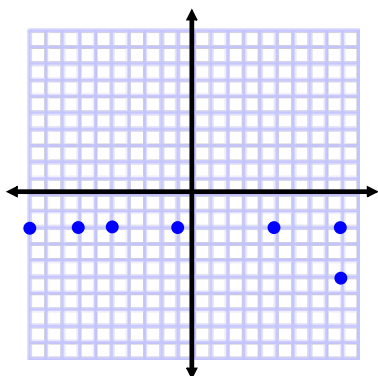


6.

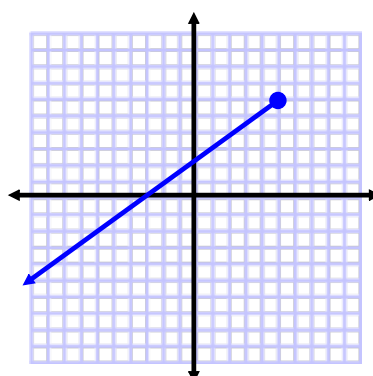


Determine if each graph is a function.  
Then state the domain and range of each.

7.

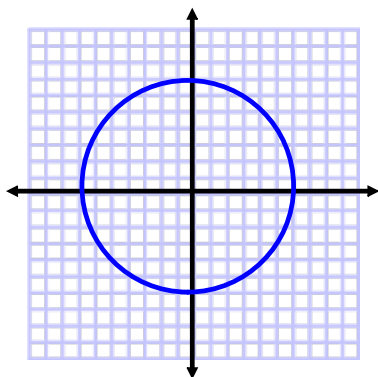


8.

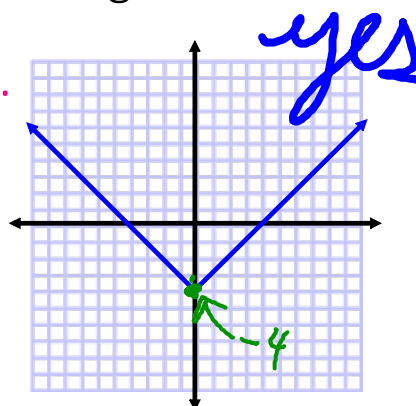


Determine if each graph is a function.  
Then state the domain and range of each.

9.



10.



$$D: -\infty \leq x \leq \infty$$

$$R: y \geq -4$$

An equation can represent a function.  
This can be written in function notation.

$$y = 2x - 5 \longrightarrow f(x) = 2x - 5$$

$x$  is the independent variable  
 $y$ , or  $f(x)$ , is the dependent variable

Evaluate each function for the given value of  $x$ .

11.  $f(x) = \frac{1}{3}x - 7$  for  $x = -11$

$$f(-11) = \frac{1}{3}(-11) - 7 = \frac{-11}{3} - \frac{7 \cdot 3}{1 \cdot 3} = \frac{-11}{3} - \frac{21}{3} = \frac{-32}{3}$$

12.  $g(x) = -x^2 + 4x - 5$  for  $x = 9$

$$g(9) = -(9)^2 + 4(9) - 5 = -81 + 36 - 5 = -50$$

13.  $h(x) = \frac{4x - 9}{2x + 1}$  for  $x = \frac{5}{2}$

$$h\left(\frac{5}{2}\right) = \frac{4\left(\frac{5}{2}\right) - 9}{2\left(\frac{5}{2}\right) + 1} = \frac{10 - 9}{5 + 1} = \frac{1}{6}$$

14. The volume of a cube with side length  $s$  is given by the function  $V(s) = s^3$ .

a) Find  $V(5)$ .  $V(5) = 5^3 = 5 \cdot 5 \cdot 5 = 125 \text{ units}^3$

b) Explain what  $V(5)$  represents.

We are trying to find the volume of a figure with a side length of 5 units.

## Attachments

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VLТ Examples.pdf

Using VLT Wksht.pdf