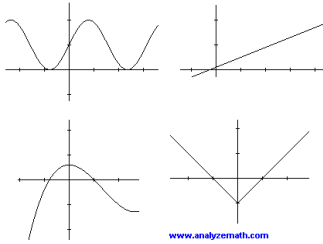


UNIT #4: Inverses and Transformations of Functions
Functions and Relations

Learning Goal:

I will learn how to identify whether a relation is a function and their corresponding domain and ranges.

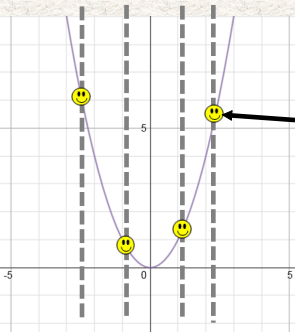


Lesson: Functions and Relations

A **function** is a set of ordered pairs such that for **every** x there is only **one** value of y .

Vertical line test:

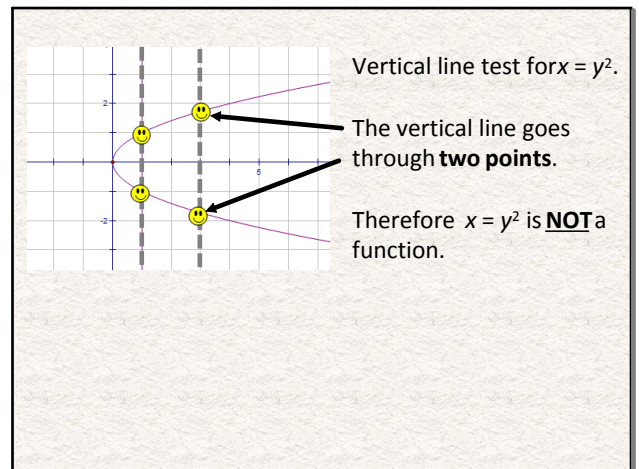
Graph a relation, and check with vertical lines that the line passes through only one point on the graph. If yes, then the relation is a function.



Vertical Line Test for $y = x^2$

Each vertical line goes through **only one point**.

Therefore $y = x^2$ **IS** a function.



Vertical line test for $x = y^2$.

The vertical line goes through **two points**.

Therefore $x = y^2$ is **NOT** a function.

Functions and Relations (Lesson).notebook

In a relation defined by a set of ordered pairs, the set of the **first elements** is the **domain** (the x -values), and the set of the **second elements** is the **range** (the y -values.)

For Example:

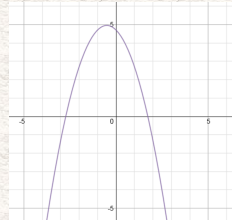
State the domain and range of the relation $\{(0, 2), (2, 3), (3, 5)\}$.

domain: $\{0, 2, 3\}$

range: $\{2, 3, 5\}$

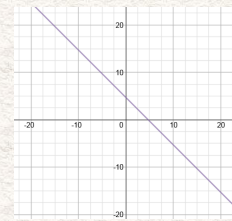
This relation is a function because **no x value is associated with 2 y values.**

Examples: State the domain and range of each relation.



domain: the set of real numbers

range: $y \leq 5$



domain: the set of real numbers

range: the set of real numbers

In function notation, the symbol $f(x)$ replaces y .

Example 1:

Evaluate $f(x) = 3x - 5$ for $x = -2$.

$$\begin{aligned} f(-2) &= 3(-2) - 5 \\ &= -11 \end{aligned}$$

Example 2:

If $f(x) = 2x - 1$, find $f(-3)$, $f(0)$, $f(5)$.

$$f(-3) = -7 \quad f(0) = -1 \quad f(5) = 9$$

Example 3:

List the ordered pairs of the function $f(x) = 3x + 2$ when the domain is $\{-1, 0, 2, 5\}$.

$$\begin{aligned} f(x) &= 3(-1) + 2 \\ &= -1 \end{aligned}$$

Therefore the ordered pair is $(-1, -1)$

$$\begin{aligned} f(x) &= 3(0) + 2 \\ &= 2 \end{aligned}$$

Therefore the ordered pair is $(0, 2)$

The other ordered pairs are: $(2, 8)$, $(5, 17)$

x-values

Example 4:

If $f(x) = -2x + 3$, find the value of x when $f(x) = 7$.

$$7 = -2x + 3$$

$$x = -2$$

**UNIT 4: Inverses and
Transformation of Functions**

Functions and Relations

Learning Goal:

I will learn how to identify whether a relation is a function and their corresponding domain and ranges.

Success Criteria:

To be successful, I must be able to...

- Identify whether the relation is a function using the vertical line test
- State the domain and range of a relation
- Evaluate a function

Practice Work

Pg. 178 #1 - 12

