Math 1050 ~ College Algebra

1 Introduction to Functions

A **relation** is a set of ordered pairs. The set of first components of the ordered pairs is called the **domain** and the set of second components of the ordered pairs is called the **range**.

input value

independent variable

output value

dependent variable

EX 1

For each of these, state whether it is a relation, and if it is, list the elements in the domain and in the range.

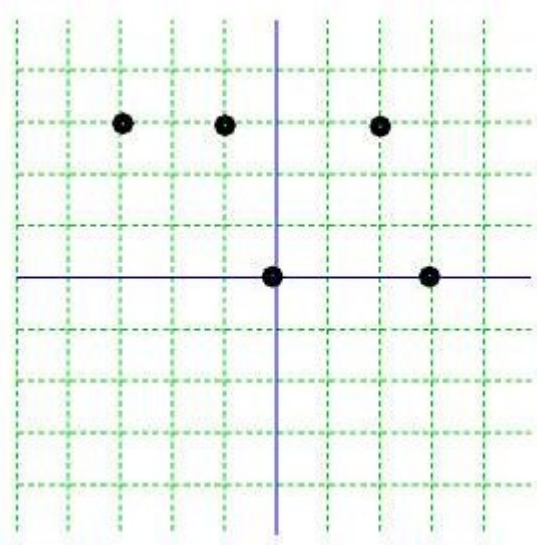
1a)

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

1b)

Bud	15
May	16
Ezi	17
Zhu	18
Tia	19

1c)



1d)

Input values: days of the week

Output values: final letter in word

1e)

{name, rank, serial number}

A **function** is a relation in which any two ordered pairs with the same first component also have the same second component.

EX 2

From example 1, which of the relations are functions?

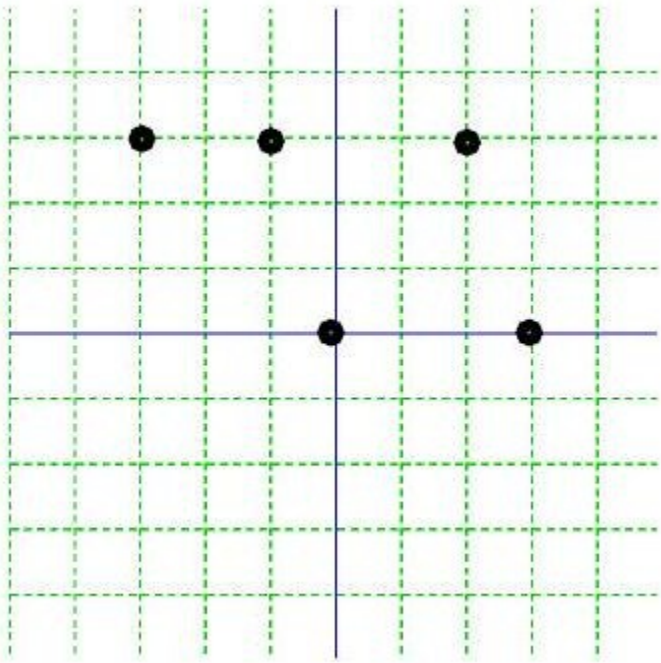
2a)

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

2b)

Bud	15
May	16
Ezi	17
Zhu	18
Tia	19

2c)



2d)

Input values: days of the week Output values: final letter in word

An equation in two variables can be a relation as can a 2-dimensional graph.

EX 3

Which of these are functions?

3a)

$x + 3 = y^2$

3b)

$2y = \sqrt{x - 1}$

3c)

$x^2 + y^2 = 9$

3d)

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

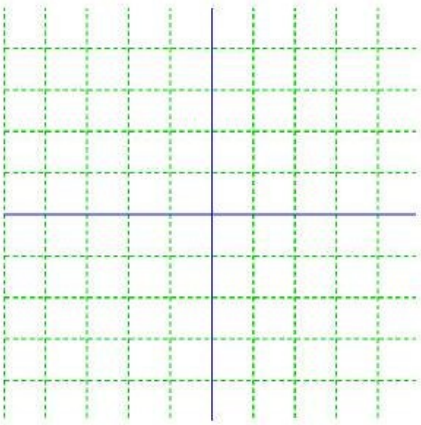
<u>The Vertical Line Test</u>: A graph represents a function if no vertical line intersects it at more than one point.

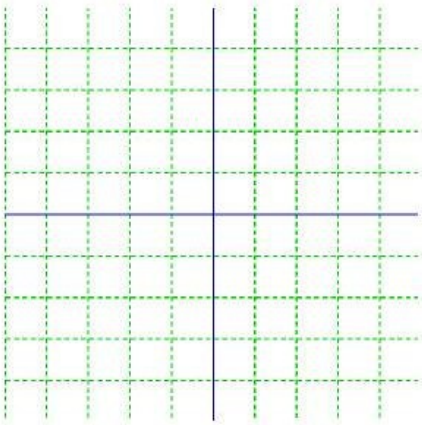
EX 4

Use the vertical line test to determine if these relations are functions.

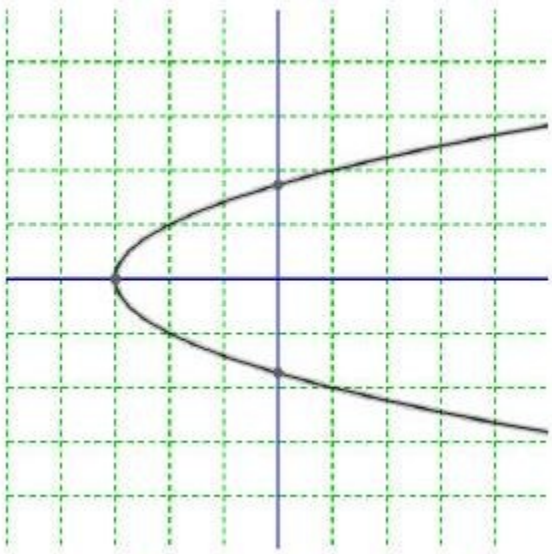
$$R_1 = \{(1,5), (5,-2), (5,4), (3,2)\}$$

$$R_2 = \{(3,1), (2,1), (5,1), (-3,2)\}$$

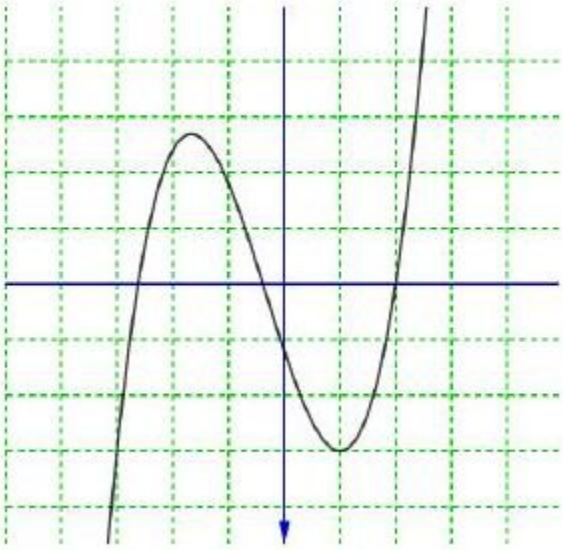




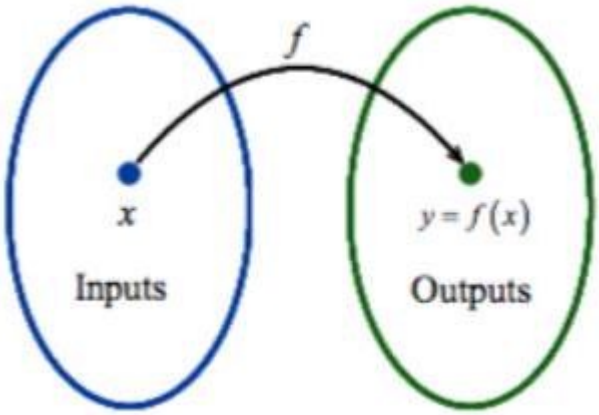
R_3



R_4



Function Notation



EX 5

Evaluate these functions for the given values.

5a)

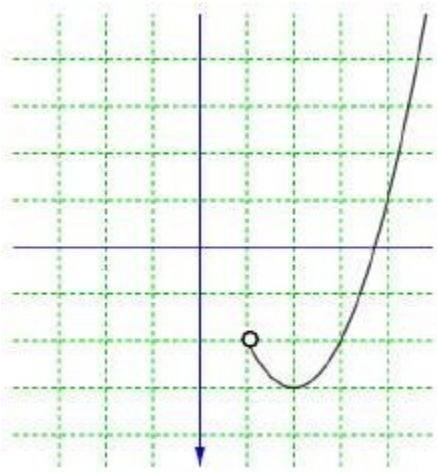
$f(x) = \sqrt{x+8} + 2$

$f(-8)$

$f(x-8)$

$f(a)$

5b)



$g(2) =$

$g(0) =$

$g(a) = -2$ for $a =$

Domain of Functions

The domain of a function is the set of all input values for which the function is defined.

Implicit domain

Explicit domain

EX 6

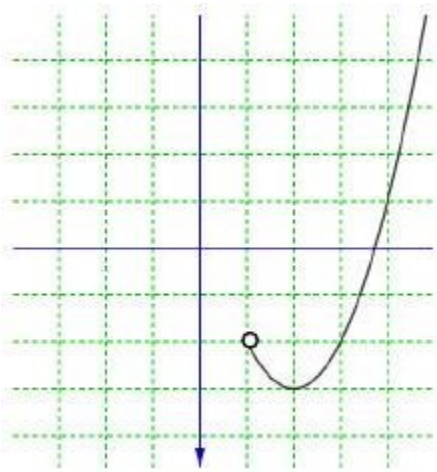
Determine the domain for each of these functions and identify as implicit or explicit.

6a)

$f(x) = \sqrt[3]{x+4}$

6b)

$p(x)$



6c)

$g(x) = \frac{3}{x^2-2x}$

6d)

$f(x) = \frac{\sqrt{x+4}}{4+x}$

6e)

$h(x) = 5x - 3, x > -1$