

Algebra IA

Notes 4.2 Functions

domain – set of input values
X-coordinates
independent variable

range – set of output values
Y-coordinates
dependent variable

Example 1: $\{(1, -2), (3, 4), (5, 7), (9, 12)\}$

domain: $\{1, 3, 5, 9\}$ the X-coordinates

range: $\{-2, 4, 7, 12\}$ the Y-coordinates

Any set of ordered pairs is called a relation. A relation in which every input has exactly one output is called a function.

In a function, no elements in the domain are repeated.

Example 1: $\{(1, -2), (3, 4), (5, 7), (9, 12)\}$

Example 1 is a function because elements in the domain are not repeated.

Example 2: $\{(1, -2), (2, 4), (1, 7), (9, 12)\}$

Example 2 is not a function because elements in the domain are repeated.

Example 3: $\{(1, -2), (2, 4), (3, 7), (9, -2)\}$

Example 3 is a function because elements in the domain are not repeated.

Real-life examples of Relations and Functions

1?

| | INPUT | OUTPUT | RELATION? | FUNCTION? |
|----|--------------------------------|-------------------|-----------|-----------|
| 1. | social security number | name | yes | yes |
| 2. | your name | course enrollment | yes | no |
| 3. | your birthday | name | yes | no |
| 4. | your Lake Shore student number | your birthday | yes | yes |
| 5. | your right thumb fingerprint | name | yes | yes |
| 6. | your calculator number | student name | yes | no |

Notes 4.3 Function Notation



The relation between a and b is a function.

Quantity a is the input (domain)

Quantity b is the output (range)

Example 1: $f(a) = a + 4$

when $a = 3$, $f(3) = 7$

when $a = -1$, $f(-1) = 3$

when $a = 0$, $f(0) = 4$

when $a = -3$, $f(-3) = 1$

when $a = -6$, $f(-6) = -2$

when $a = 10$, $f(10) = 14$

$f(6) = 10$

$f(-7) = -3$

$f(9) = 13$

Example 2: $g(x) = 2x + 1$

when $x = 3$, $g(3) = 7$

when $x = -1$, $g(-1) = -1$

when $x = 0$, $g(0) = 1$

when $x = -2$, $g(-2) = -3$

when $x = -8$, $g(-8) = -15$

when $x = 10$, $g(10) = 21$

$g(6) = 13$

$g(-7) = -13$

$g(9) = 19$