

Section 1.2 - Functions & Their Properties

* Factoring worksheet due Thursday!

DEFINITION Function, Domain, and Range

A function from a set D to a set R is a rule that assigns to every element in D a unique element in R . The set D of all input values is the **domain** of the function, and the set R of all output values is the **range** of the function.

- **EXAMPLE 1** Defining a Function

Does the formula $y = x^2$ define y as a function of x ?

Find the domain of each of these functions:

(a) $f(x) = \sqrt{x + 3}$

(b) $g(x) = \frac{\sqrt{x}}{x - 5}$

(c) $A(s) = (\sqrt{3}/4)s^2$, where $A(s)$ is the area of an equilateral triangle with side length s .

Homework:

In Exercises 1–4, determine whether the formula determines y as a function of x . If not, explain why not.

1. $y = \sqrt{x-4}$ **Y**

2. $y = x^2 \pm 3$ **Y**

3. $x = 2y^2$ **N**

4. $x = 12 - y$ **Y**



In Exercises 9–16, find the domain of the function algebraically and support your answer graphically.

9. $f(x) = x^2 + 4$

10. $h(x) = \frac{5}{x-3}$ **$\mathbb{R} \ x \neq 3$**

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

12. $f(x) = \frac{1}{x} + \frac{5}{x-3}$

13. $g(x) = \frac{x}{x^2-5x}$

14. $h(x) = \frac{\sqrt{4-x^2}}{x-3}$ **$\mathbb{R} \ -2 \leq x \leq 2 \ \{-2, -1, 0, 1, 2\}$**

15. $h(x) = \frac{\sqrt{4-x}}{(x+1)(x^2+1)}$

16. $f(x) = \sqrt{x^4-16x^2}$

In Exercises 17–20, find the range of the function.

17. $f(x) = 10 - x^2$

18. $g(x) = 5 + \sqrt{4-x}$ **$\mathbb{R} \ y \geq 5$**

19. $f(x) = \frac{x^2}{1-x^2}$

20. $g(x) = \frac{3+x^2}{4-x^2}$