

# Domain and Range

## Algebra 1 • Section 4.3

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 12

### Quick Review and Helpful Hints

A function pairs each input with exactly one output. Pay attention to what the input means, what rule is being applied, and whether the question asks for a value, a rule, a domain, or an interpretation.

▷ **Example:** For  $f(x) = 2x + 5$ , find  $f(4)$ .

**Work:** Replace  $x$  with 4:  $f(4) = 2(4) + 5 = 13$ .

★ **Answer:** 13

### ◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Find the domain of  $f(x) = \sqrt{x-3}$ . \_\_\_\_\_

6. Find the range of  $\{(-2, 5), (1, 7), (4, 7)\}$ . \_\_\_\_\_

2. Find the domain of  $g(x) = \frac{1}{x+4}$ . \_\_\_\_\_

7. Find the domain of  $y = 3x - 9$ . \_\_\_\_\_

3. Find the range of  $y = x^2$ . \_\_\_\_\_

8. Find the range of  $y = -x^2 + 4$ . \_\_\_\_\_

4. Find the range of  $y = (x-2)^2 + 5$ . \_\_\_\_\_

9. Find the domain of  $h(x) = \sqrt{10-2x}$ . \_\_\_\_\_

5. Find the domain of  $\{(-2, 5), (1, 7), (4, 7)\}$ . \_\_\_\_\_

10. Find the domain of  $p(x) = \frac{x+1}{x^2-9}$ . \_\_\_\_\_

### ◆ Word Problems

11. A movie ticket must have a whole-number seat from 1 to 120. Describe the domain. \_\_\_\_\_

12. A water tank starts at 50 gallons and drains to 0. Describe the range. \_\_\_\_\_



## Answer Keys

1.  $x \geq 3$

2.  $x \neq -4$

3.  $y \geq 0$

4.  $y \geq 5$

5.  $\{-2, 1, 4\}$

6.  $\{5, 7\}$

7. All real numbers

8.  $y \leq 4$

9.  $x \leq 5$

10.  $x \neq -3, 3$

11. Integers 1 through 120

12.  $0 \leq y \leq 50$

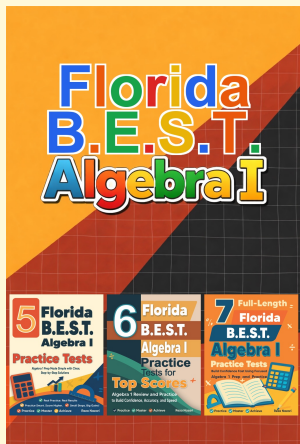
### Step-by-Step Explanations

1. Square roots refuse negatives underneath, so  $x - 3$  has to be zero or more, meaning  $x \geq 3$ .
2. Dividing by zero is off-limits, and  $x + 4$  hits zero at  $-4$ , so steer clear of  $-4$ .
3. Squaring anything erases the negative sign, so outputs start at 0 and only climb.
4. That squared chunk is at least 0, and 5 rides along, so the floor for outputs is 5.
5. Domain is just the input side, so grab the first number from each pair.
6. Range is the output side; 7 shows twice but you only need to list it once.

7. No fractions, no roots, nothing forbidden here, so every real number is welcome as an input.
8. The negative flips the parabola upside down, so it peaks at 4 and everything else sits below.
9. Keep what's under the root from going negative:  $10 - 2x \geq 0$  solves to  $x \leq 5$ .
10. Factor the bottom into  $(x - 3)(x + 3)$  and toss out whatever zeroes it: both 3 and  $-3$ .
11. You can't sit in seat 4.7, so the inputs jump in whole steps, not smoothly.
12. The water can sit anywhere between bone-dry and the full 50, and both ends count.



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