

# 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

- $x \geq 3$
- $x \neq -4$
- $y \geq 0$
- $y \geq 5$
- $\{-2, 1, 4\}$
- $\{5, 7\}$
- All real numbers
- $y \leq 4$
- $x \leq 5$
- $x \neq -3, 3$
- Integers 1 through 120
- $0 \leq y \leq 50$

### Step-by-Step Explanations

- Square roots refuse negatives underneath, so  $x - 3$  has to be zero or more, meaning  $x \geq 3$ .
- Dividing by zero is off-limits, and  $x + 4$  hits zero at  $-4$ , so steer clear of  $-4$ .
- Squaring anything erases the negative sign, so outputs start at 0 and only climb.
- That squared chunk is at least 0, and 5 rides along, so the floor for outputs is 5.
- Domain is just the input side, so grab the first number from each pair.
- Range is the output side; 7 shows twice but you only need to list it once.
- No fractions, no roots, nothing forbidden here, so every real number is welcome as an input.
- The negative flips the parabola upside down, so it peaks at 4 and everything else sits below.
- Keep what's under the root from going negative:  $10 - 2x \geq 0$  solves to  $x \leq 5$ .
- Factor the bottom into  $(x - 3)(x + 3)$  and toss out whatever zeroes it: both 3 and  $-3$ .
- You can't sit in seat 4.7, so the inputs jump in whole steps, not smoothly.
- The water can sit anywhere between bone-dry and the full 50, and both ends count.



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