

Domain and Range

Algebra 1 • Section 4.3

Name: _____

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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. $x \geq 3$ | 7. All real numbers |
| 2. $x \neq -4$ | 8. $y \leq 4$ |
| 3. $y \geq 0$ | 9. $x \leq 5$ |
| 4. $y \geq 5$ | 10. $x \neq -3, 3$ |
| 5. $\{-2, 1, 4\}$ | 11. Integers 1 through 120 |
| 6. $\{5, 7\}$ | 12. $0 \leq y \leq 50$ |

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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