

Student Workbook

Domain & Range

Name: _____

Date: _____

Period: _____

Learning Target: I can find the domain and range of a function from a graph or an equation, and write it using interval notation.

Vocabulary

Term	Meaning
Domain	The set of all possible input (x) values for a function.
Range	The set of all possible output (y) values for a function.
Interval Notation	A way to write a set of numbers using parentheses (not included) and brackets (included), e.g., [2, 5).
Set-Builder Notation	A way to describe a set using a rule, e.g., {x x ≥ 3} means "all x such that x is greater than or equal to 3."

Key Concept: Domain and Range from a Graph

HOW TO READ A GRAPH

Domain: scan the graph from left to right — what x-values does the graph cover?

Range: scan the graph from bottom to top — what y-values does the graph cover?

EXAMPLE 1

A parabola opens upward with vertex (0, -2), extending forever left, right, and upward.

Domain: _____ Range: _____

EXAMPLE 2

A line segment runs from (-4, -2) to (6, 3), with closed (filled) circles at both endpoints.

Domain: _____ Range: _____

Key Concept: Domain from an Equation

TWO THINGS TO WATCH FOR

1. **Denominators cannot equal zero.** Set the denominator equal to 0 and exclude that x-value.
2. **Expressions under a square root cannot be negative.** Set the expression ≥ 0 and solve.

EXAMPLE 3 — Rational Function

Find the domain of $f(x) = 1/(x - 3)$.

Set denominator = 0: $x - 3 = \underline{\hspace{2cm}}$ $\rightarrow x = \underline{\hspace{2cm}}$

Domain: all real numbers except $\underline{\hspace{2cm}}$

EXAMPLE 4 — Square Root Function

Find the domain of $f(x) = \sqrt{x - 5}$.

Set the inside ≥ 0 : $x - 5 \geq \underline{\hspace{2cm}}$ $\rightarrow x \geq \underline{\hspace{2cm}}$

Domain: $[\underline{\hspace{2cm}}, \infty)$

Guided Practice — Part A: Domain & Range from a Graph

- A1** An entire parabola opening upward, vertex at (0,-2), extending forever in both x-directions.

- A2** A line segment from (-4,-2) to (6,3), closed circles at both ends.

- A3** The upper half of a circle of radius 5 centered at the origin (a semicircle arching from (-5,0) up to (0,5) and back down to (5,0)).

Guided Practice — Part B: Domain of Rational Functions

- B1** $f(x) = 1 / (x + 4)$

B2 $f(x) = (x - 2) / (x^2 - 9)$

This denominator factors — find BOTH excluded values.

Guided Practice — Part C: Domain of Radical Functions

C1 $f(x) = \sqrt{x + 6}$

C2 $f(x) = \sqrt{10 - 2x}$

Careful — you'll need to flip an inequality sign here.

Guided Practice — Part D: Interval & Set-Builder Notation

D1 Write "x is greater than or equal to -3" in interval notation and set-builder notation.

D2 Write "all real numbers except x = 5" in interval notation and set-builder notation.

BEFORE YOU MOVE ON

Check with a partner: did you use brackets [] for included endpoints and parentheses () for excluded ones or infinity?