

UNIT 4 • MODELING AND ANALYZING EXPONENTIAL FUNCTIONS

Lesson 2: Domain and Range of Exponential Functions

Instruction

Lesson 4.2.1: Domain and Range of Exponential Functions

Georgia Standards of Excellence

MGSE9–12.F.IF.1

MGSE9–12.F.IF.2

Warm-Up 4.2.1: Debrief

1. What inputs would make sense for this function?

In the function $f(x) = 2000 \cdot 1.06^x$, x represents years. Because the interest is compounded annually, the inputs of x should be whole numbers. Additionally, the investment was growing over 7 years, so the inputs should start at $x = 0$ and end at $x = 7$.

The possible inputs are: $\{0, 1, 2, 3, 4, 5, 6, 7\}$

2. What is the initial value of the investment?

The initial value of the investment is the \$2,000 that Katya deposited, which corresponds to $x = 0$ in the function.

3. What is the value of the investment after 7 years?

To find the value of the investment after 7 years, evaluate the function for $x = 7$:

$$f(x) = 2000 \cdot 1.06^x \quad \text{Original function}$$

$$f(7) = 2000 \cdot 1.06^{(7)} \quad \text{Substitute 7 for } x.$$

$$f(7) \approx 2000 \cdot 1.50363 \quad \text{Evaluate the exponent.}$$

$$f(7) \approx 3007.26 \quad \text{Simplify.}$$

The value of the investment after 7 years is \$3,000.26.

Connection to the Lesson

- Students will use function notation with exponential functions.
- Students will identify a domain that makes sense for the problem context.
- Students will identify the endpoints of a range.