Name: _____ Math 7.2, Period _____

Mr. Rogove Date: _____

LEARNING OBJECTIVE: We will use equations to define and evaluate functions. (Lesson 96)

ACTIVATING PRIOR KNOWLEDGE:

Study the different representations of a function below.

TABLE:

Input	0	1	2	3	4	5
Output	1	2	4	8	16	32

Exponential

- Outputs multiplying by 2
- Inputs adding 1

FUNCTION:

Let $f: \{0, 1, 2, 3, 4, 5\} \to \{1, 2, 4, 8, 16, 32\}$ such that $\boxed{x \mapsto 2^x}$.

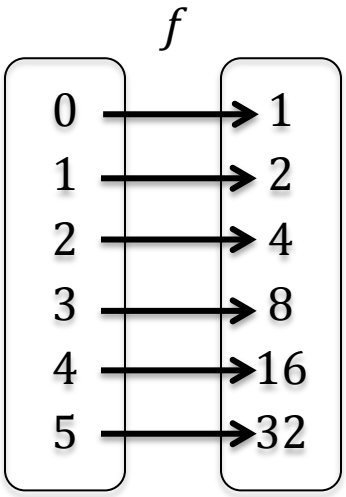
x_1, x_2, x_3

function X input Y output

input/output relationship

- Inputs maps to the same output in each representation
- 2 is always base input is power
- They all represent the same equation $y = 2^x$

DIAGRAM:



CONCEPT DEVELOPMENT:

X−5

Algebraic Function: Given an algebraic expression in one variable, an algebraic function is a function $f: X \to \mathbb{R}$ such that for each real number x in the domain X, $f(x)$ is the value found by substituting the $\boxed{\text{number } x}$ into all instances of the variable symbol in the algebraic expression and evaluating.

Examples:

$f(x) = x - 5$ Domain: All real numbers

$g(x) = 2^x$

$f(8) = 3$

$g(8) = 256$

Name: _____ Math 7.2, Period _____

Mr. Rogove Date: _____

Guided Practice:

Steps to Evaluating Functions

1. Read the function rule.
2. Substitute the appropriate x in X to the expression $f(x)$.
3. Evaluate the function.
4. Identify any restrictions on domain and range of the function as directed.

The squaring function is defined as follows: Let $f: X \to Y$ be the function such that $x \longmapsto x^2$, where X is the set of all real numbers. Find: $f(0) = 0^2 = 0$ $f(3) = 3^2 = 9$ $f(-2) = (-2)^2 = 4$ $f(\sqrt{3}) = (\sqrt{3})^2 = 3$ $f(-2.5) = (-2.5)^2 = 6.25$ $f\left(\frac{2}{3}\right) = \left(\frac{2}{3}\right)^2 = \frac{4}{9}$ $f(a) = a^2$ $f(a+3) = (a+3)^2 = a^2+6a+9$ Domain: All $\mathbb{R}$ Range: All $\mathbb{R} \geq 0$	The exponential function is defined as follows: $g(x) = 2^x$ Find: $g(0) = 2^0 = 1$ $g(3) = 2^3 = 8$ $g(-2) = 2^{-2} = \frac{1}{4}$ $g(10) = 2^{10} = 1024$ $g(\frac{1}{2}) = 2^{\frac{1}{2}} = \sqrt{2}$ Domain: All $\mathbb{R}$ Range: All $\mathbb{R}$s ≥ 0

Name: _____ Math 7.2, Period _____

Mr. Rogove Date: _____

The square root function: Let $f(x) = \sqrt{x+2}$ Find: $f(0) = \sqrt{0+2} = \sqrt{2}$ $f(-2) = \sqrt{-2+2} = \sqrt{0} = 0$ $f(7) = \sqrt{7+2} = \sqrt{9} = 3$ $f(14) = \sqrt{14+2} = \sqrt{16} = 4$ $f(5) = \sqrt{5+2} = \sqrt{7}$ $f(-5) = \sqrt{-5+2} = \sqrt{-3}$ -5 is not a part of our domain! $f(4.25) = \sqrt{2+4.25} = \sqrt{6.25}$ 2.5 What are the restrictions on the domain and the range? Domain: All $\mathbb{R}$ where $x \geq -2$ Range: All $\mathbb{R}$ where $x \geq 0$	Let $f(x) = 4(3)^x$ Exponential Find: $f(0) = 4(3)^0 = 4$ $f(1) = 4(3)^1 = 12$ $f(2) = 4(3)^2 = 36$ $f(3) = 4(3)^3 = 4 \cdot 27 = 108$ $f(4) - f(2) = 4 \cdot 3^4 - 4 \cdot 3^2$ $324 - 36 = 288$ $f(-3) = 4(3)^{-3} = \frac{4}{27}$ What are the restrictions on the domain and range? D: All $\mathbb{R}$ R: All $\mathbb{R}$ $x \geq 0$

Name: _____ Math 7.2, Period _____

Mr. Rogove Date: _____

Independent Practice:

Students complete Problem Set for Independent Practice….Page s. 63-65 Rest is HW.

Closure:

Write three different polynomial functions such that $f(3) = 2$

$f(x) = \frac{6}{x}$, $f(x) = \frac{2}{3}x$

$f(x) = x^2 - 2x - 1$

$f(x) = x - 1$

$f(x) = -x^2 + 11$

$f(x) = 2$ $f(x) = x^2 - 7$

Notes:

This accompanies lesson 10 from Alg 1 Mod 3.