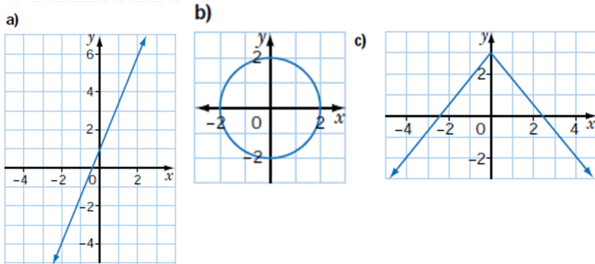


Warm-Up: State the Domain and Range



Terminology:

- { } enclose elements of a set
- , separates elements within the brackets
- \mathbb{R} means real numbers
- \mathbb{Z} means integers
- \in means "an element of"

UNIT #4: Inverses and Transformations of Functions

Types of Functions

Learning Goal:

I will learn how to identify types of functions and their domain and ranges.



Lesson: Types of Functions

Rational Functions - Functions consisting of a "ratio" of expressions.

Restriction: denominator cannot equal 0.

Root Functions: Number under the radical sign must be positive (or 0 if it is in the numerator).

Restriction: cannot take the square root of a negative number.

Definitions:

The **domain** of a function is all possible values that the **variable x** can be.

The **range** of a function is all possible values that the **variable y** can be.

The domain and range of functions are dependent on the **two restrictions:**

1. We cannot divide by 0.
2. We cannot take the square root of a negative number.

Types of Functions (Lesson).notebook

State the type of function, the domain and range.

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

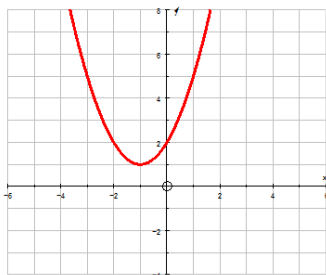
Type of function:
Quadratic

Domain:

$$D: \{x \mid x \in \mathbb{R}\}$$

Range:

$$R: \{y \mid y \in \mathbb{R}, y \geq 1\}$$



$$f(x) = -1$$

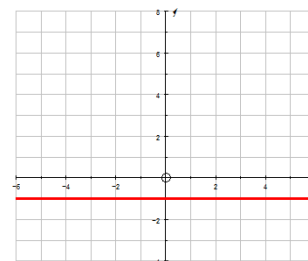
Type of function:
Constant

Domain:

$$D: \{x \mid x \in \mathbb{R}\}$$

Range:

$$R: \{y \mid y \in \mathbb{R}, y = -1\}$$



$$f(x) = -x + 1$$

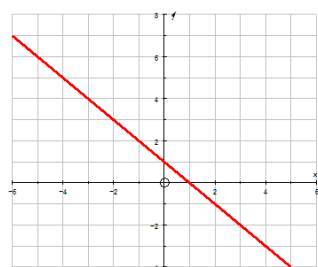
Type of function:
Linear

Domain:

$$D: \{x \mid x \in \mathbb{R}\}$$

Range:

$$R: \{y \mid y \in \mathbb{R}\}$$



$$f(x) = 1/x$$

Type of function:
Rational

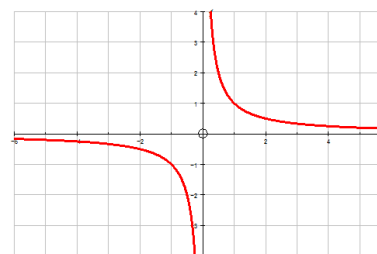
Domain:

$$D: \{x \mid x \in \mathbb{R}, x \neq 0\}$$

(Cannot have zero in denominator)

Range:

$$R: \{y \mid y \in \mathbb{R}, y \neq 0\}$$



Types of Functions (Lesson).notebook

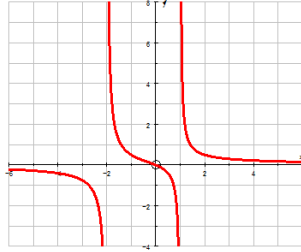
$$f(x) = \frac{x}{x^2 + x - 2}$$

Type of function:
Rational

Domain:

$$D: \{x \mid x \in \mathbb{R}, x \neq -2, 1\}$$

Factored form of denominator is:
 $(x+2)(x-1)$
Denominator cannot be zero.



Range:

$$R: \{y \mid y \in \mathbb{R}\}$$

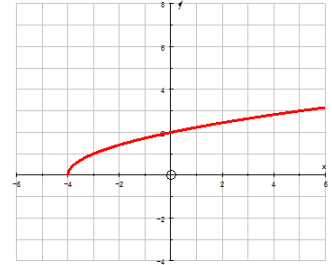
$$f(x) = \sqrt{x+4}$$

Type of function:
Root

Domain:

$$D: \{x \mid x \in \mathbb{R}, x \geq -4\}$$

(Cannot have a negative under the square root sign)



Range:

$$R: \{y \mid y \in \mathbb{R}, y \geq 0\}$$

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

Type of function:
Exponential

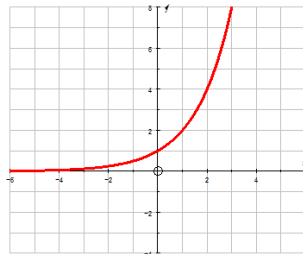
Domain:

$$D: \{x \mid x \in \mathbb{R}\}$$

Range:

$$R: \{y \mid y \in \mathbb{R}, y > 0\}$$

($y = 0$ is the asymptote therefore function will not touch the y-axis)



UNIT 4: Inverses and Transformation of Functions

Functions and Relations

Learning Goal:

I will learn how to identify types of functions and their domain and ranges.

Success Criteria:

To be successful, I must be able to...

- Identify the type of function
- Graph the function
- State the domain and range of a function

Practice Work

Graphs a-i
Handout 8.1

HOMEWORK

Draw and state the domain and range for:

a) $y = \frac{-3}{x+5}$

b) $y = 1/2x - 1$

c) $y = \sqrt{x+6}$

d) $y = x^2 - 2$

e) $xy = 1$

f) $y = \frac{1}{x-1}$

g) $y = \sqrt{16-x^2}$

h) $y = x^3 + 2$

i) $x^2 + y^2 = 16$

Handout Exercise 8.1