

# GENERAL MATHEMATICS

Name: \_\_\_\_\_ Grade Level: \_\_\_\_\_  
Date: \_\_\_\_\_ Score: \_\_\_\_\_

## LEARNING ACTIVITY SHEET THE DOMAIN AND RANGE OF RATIONAL FUNCTION

### Background Information for Learners

This activity serves as a learning guide for the learners. It facilitates lesson comprehension as it specifically aims for student's mastery in finding the Domain and the Range of a Rational Functions.

The Domain of a function  $f(x)$  is the set of all values for which the function is defined and the range of the function is the set of all values that  $f$  takes. The Domain and Range of a Rational Function may be found by the following: a) using algebraic solution b) looking at its graph c) sketching its graph.

**Learning Competency:** The learner finds the domain and range of a rational function. (MIIGM-1b-5)

### Activity 1

**Example:** Find the domain and range using algebraic method of the rational function

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

**Solutions:** To find the domain, let the denominator

$$x+2 = 0$$

$$x = -2$$

Therefore, the domain is

$$\mathbf{D: \{x/x \text{ is a set of all real numbers, } x \neq -2\}}$$

To find the range, solve  $x$  in terms of  $y$

$$y = \frac{x}{x+2}$$

$$y(x+2) = x$$

$$xy - 2y = x$$

$$xy - x = 2y$$

$$x(y-1) = 2y$$

$$x = \frac{2y}{y-1}$$

Therefore, the range is

$$\mathbf{R: \{y/y \text{ is set of all real numbers, } y \neq 1\}}$$

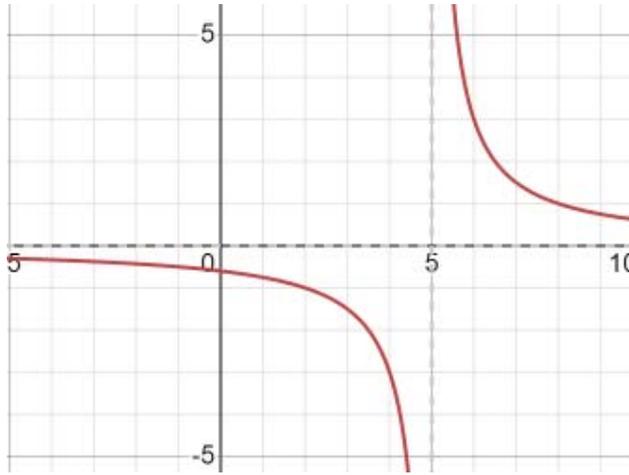
**Find the domain and range of the following rational functions using algebraic method.**

a.  $y = \frac{2}{x-1}$

b.  $y = \frac{x-2}{2x+4}$

### Activity 2

Find the asymptotes and domain and range of this given graph below.



Asymptotes

Vertical:  $x=5$

Horizontal:  $y=0$

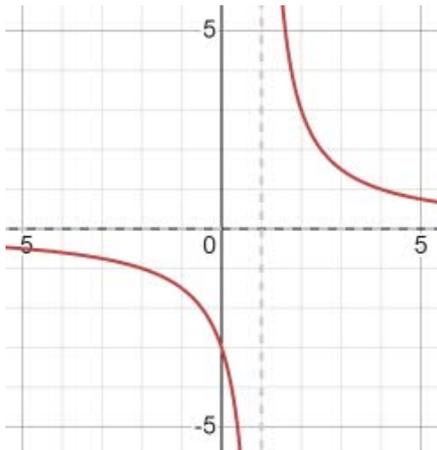
Domain:  $\{x/x \text{ is a set of all real numbers, } x \neq 5\}$

Range:  $\{y/y \text{ is a set of all real numbers, } y \neq 0\}$

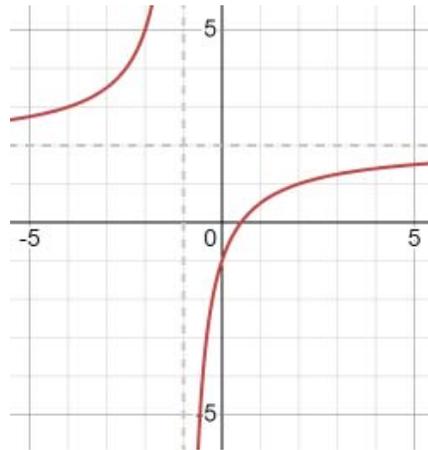
Continuation:

Find the domain and range of the given graph of rational function.

a.



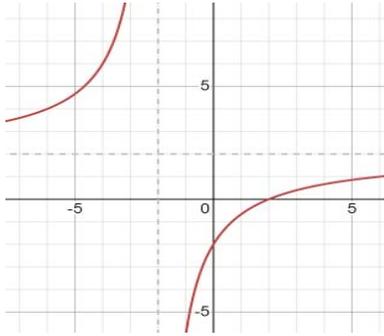
b.



### Activity 3

**Example:** Sketch the graph of  $f(x) = \frac{2x-4}{x+2}$  then, find the domain and range.

**Answer:**



Domain:  $\{x/x \text{ is a set of all real numbers, } x \neq -2\}$

Range:  $\{y/y \text{ is a set of all real numbers, } y \neq 2\}$

Sketch the graph of each rational function. Then, find their domain and range

A.  $f(x) = \frac{1}{4x-1}$

B.  $g(x) = \frac{x+2}{x-3}$

### Reflection:

What have I learned from the topic?

---

### References:

GENERAL MATHEMATICS (LM), First Edition 2016, DIWA Senior High School Series: General Mathematics, Next Century Mathematics 11 General Mathematics Copyright 2016

**Answer key**

**(Activity 1)**

a.  $y = \frac{2}{x-1}$

To find the domain, let the denominator

$$x-1 = 0$$

$$x = 1$$

Therefore, the domain is

**D:  $\{x/x \text{ is a set of all real numbers, } x \neq 1\}$**

To find the range, solve x in terms of y

$$y = \frac{2}{x-1}$$

$$y(x-1) = 2$$

$$xy - y = 2$$

$$xy = y + 2$$

$$x = \frac{y+2}{y}$$

Therefore, the range is

**R:  $\{y/y \text{ is set of all real numbers, } y \neq 0\}$**

b.  $y = \frac{x-2}{2x+4}$

To find the domain, let the denominator

$$2x+4 = 0$$

$$2x = -4$$

$$x = -2$$

Therefore, the domain is

**D:  $\{x/x \text{ is a set of all real numbers, } x \neq -2\}$**

To find the range, solve x in terms of y

$$y = \frac{x-2}{2x+4}$$

$$y(2x+4) = x-2$$

$$2xy + 4y = x - 2$$

$$2xy - x = -4y - 2$$

$$x(2y-1) = -4y-2$$

$$x = \frac{-4y-2}{2y-1}$$

Therefore, the range is

**R:  $\{y/y \text{ is set of all real numbers, } y \neq \frac{1}{2}\}$**

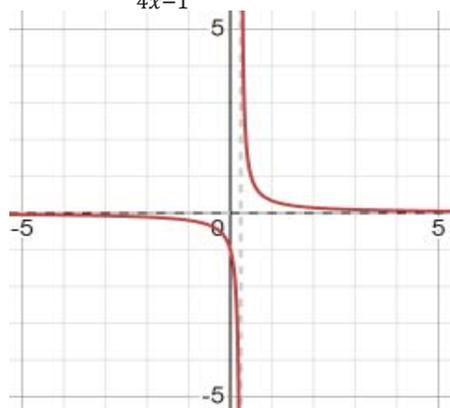
(Activity 2)

- A. a.  $x=1$   
b.  $y=0$   
c. D:  $\{x/x \text{ is a set of all real numbers, } x \neq 1\}$   
d. R:  $\{y/y \text{ is set of all real numbers, } y \neq 0\}$

- B. a.  $x=-1$   
b.  $y = \frac{1}{2}$   
c. D:  $\{x/x \text{ is a set of all real numbers, } x \neq -1\}$   
d. R:  $\{y/y \text{ is set of all real numbers, } y \neq \frac{1}{2}\}$

(Activity 3)

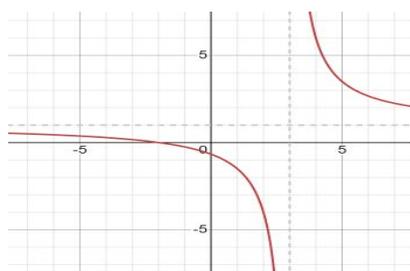
a.  $f(x) = \frac{1}{4x-1}$



Domain:  $\{x/x \text{ is a set of all real numbers, } x \neq \frac{1}{4}\}$

Range:  $\{y/y \text{ is a set of all real numbers, } y \neq 0\}$

b.  $g(x) = \frac{x+2}{x-3}$



Domain:  $\{x/x \text{ is a set of all real numbers, } x \neq 3\}$

Range:  $\{y/y \text{ is a set of all real numbers, } y \neq 1\}$