GENERAL MATHEMATICS 11

Name: _____   **Grade Level:** _____
Date: _____   **Score:** _____

Learning Activity Sheet
Solving Rational Equations and Inequalities

Background Information for Learners

A **rational expression** is an expression that can be written as a ratio of two polynomials.

A rational expression can be described as a function where either the numerator, denominator, or both have a variable on it.

A rational equation or inequality can be solved for all *x* values that satisfy the equation or inequality. Whereas we solve an equation or inequality, we do not "solve" functions. Rather, a function (and in particular, a rational function) expresses a relationship between two variables (such as *x* and *y*), and can be represented by a table of values or a graph.

A basic application of rational equation is problems from the multiplication-division operations. It is given by all the multiplicative formulas of the form AB=C may be written as A=$\frac{B}{C}$. This divisional from lead to rational equations.

The calculation of "per unit" such as "cost per unit" or amount per unit and even production problems are good examples of rational equation.

Learning Competency

Solves rational equations and inequalities.*(M11GM-Ib-3)*

Activity 1:The Hidden Message

Directions**:** A Hidden Message was encrypted and can only be deciphered by answering some rational equations. Each answer corresponds to one word. The arrangement of the words will be given. Your task is to decode the message. GOODLUCK!

 (LIVES)

$$\frac{y}{y-3} + \frac{6}{y+3} = 1$$

(HOME)

$$\frac{1}{n-2} = \frac{2n+1}{n^2+2n-8} + \frac{2}{n+4}$$

(SAVE)

$$\frac{10}{3} = \frac{4}{x} + 2$$

(SAFE)

$$\frac{6}{x} + \frac{5}{4} = \frac{-7}{4}$$

Note: Practice Personal Hygiene protocols at all times

(STAY)

$$\frac{1}{x} + \frac{1}{(x-8)} = \frac{1}{3}$$

12	7/3	12	-2	3	1

Activity 2:Think Rational; Solves Inequalities

Directions: Solve the rational inequality

1. $\dfrac{x^2+8x+16}{x^2-x-20} \geq 0$

2. $\dfrac{x+5}{x^2+6x+9} > 0$

3. $\dfrac{x^2-49}{x^2+13x+42} \leq 0$

Note: Practice Personal Hygiene protocols at all times

Activity 3: Sail!Sale!Sayl

Directions: Answer the problem involving real life representation of rational equation.

2. Sayl Corporation experts on the sale of sails used in small boats. Their monthly revenue (in thousands) for the nth week after they opened is given by the equation $S = \frac{120t}{t^2+100}$.
   a. What are their sales in their 5th week?

   b. What is their sale after a quarter?(assuming that a month is composed of 4 weeks)

   c. What is their sale after half a year? (assuming that a month is composed of 4 weeks)

   d. In which week would the sale (s)have been 6?(note that the sales is express in thousands)

   e. In which week would the sale(s) have been 8? (note that the sales is express in thousa

Rubrics for scoring

Simple pointing scoring;

Activity 1; 1 point each item and 5 points on the decoded message.

Activity 2; 5 points each item.

Activity 3; 3 points each item.

Reflection

Direction: Complete the table below that shows your learning on rational equations and inequalities.

What I learned about…

Rational Equations	**Rational Inequalities**

References for the Learners

5. (https://study.com/academy/lesson/solving-equations-inequalities-involving-rational-functions.html)
6. (http://teachtogether.chedk12.com/teaching_guides/view/6)

Note: Practice Personal Hygiene protocols at all times

Answer Key

ACTIVITY 1

(LIVES)

$$\frac{y}{y-3} + \frac{6}{y+3} = 1$$

LCD is (y-3)(y+3)

$$(y-3)(y+3)](\frac{y}{y-3} + \frac{6}{y+3} = 1)$$

y(y+3)+(6)(y-3)=(y+3)(y-3)

y²+3y+6y-18=y²-9

y²+9y-18=y²-9

9y=9
___
 9

Y=1

(HOME)

$$\frac{1}{n-2} = \frac{2n+1}{n^2+2n-8} + \frac{2}{n+4}$$

$$[(n-2)(n+4)](\frac{1}{n-2} = \frac{2n+1}{n^2+2n-8} + \frac{2}{n+4})$$

1(n+4)=2n+1+2(n-2)

n+4=2n+1+2n-4

n+4=4n-3

7=3n
___
 3

n= 7/3

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Note: Practice Personal Hygiene protocols at all times

(SAVE)

$$\frac{10}{3} = \frac{4}{x} + 2$$

$$(3x)(\frac{10}{3} = \frac{4}{x} + 2)$$

10x=12+6x

<u>4x=12</u>

  4

x=3

(SAFE)

$$\frac{6}{x} + \frac{5}{4} = \frac{-7}{4}$$

$$(4x)(\frac{6}{x} + \frac{5}{4} = \frac{-7}{4})$$

24+5x=-7x

<u>24=-12x</u>

  -12

x=-2

(STAY)

$$\frac{1}{x} + \frac{1}{(x-8)} = \frac{1}{3}$$

$$[(x)(x-8)(3)](\frac{1}{x} + \frac{1}{(x-8)} = \frac{1}{3})$$

(3)(1)(x-8)+(x)(3)=(x)(x-8)

3x-24+3x=x^2-8x

X^2-8x-6x+24=0

X^2-14x-24=0

Note: Practice Personal Hygiene protocols at all times

(x-12)(x-2)

X=12;x=2

Stay	Home	Stay	Safe	Save	Lives
12	7/3	12	-2	3	1

ACTIVITY 2

1. $\frac{x^2+8x+16}{x^2-x-20} \geq 0$

Note: Practice Personal Hygiene protocols at all times

$$\frac{(x+4)(x+4)}{(x-5)(x+4)} \geq 0$$

$$\frac{x+4}{x-5} \geq 0$$

X+4=0   x-5=0

x=-4   x=5

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                             -4                    5

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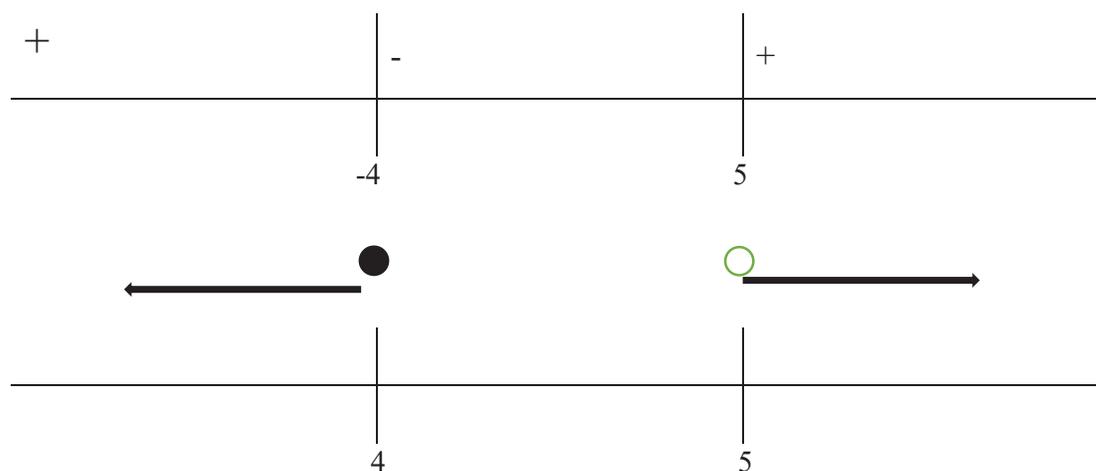
Answer: $(-\infty, 4] \cup (5, \infty)$

2. $\frac{x+5}{x^2+6x+9} > 0$

$$\frac{x+5}{(x+3)(x+3)} > 0$$

$$\frac{x+5}{(x+3)^2} > 0$$

X+5=0   x+3=0

x=-5   x=-3

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                │                 │
────────────────┼─────────────────┼────────────────
                │                 │
               -5                -3
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────────────────┼─────────────────┼────────────────
                │                 │
               -5                -3
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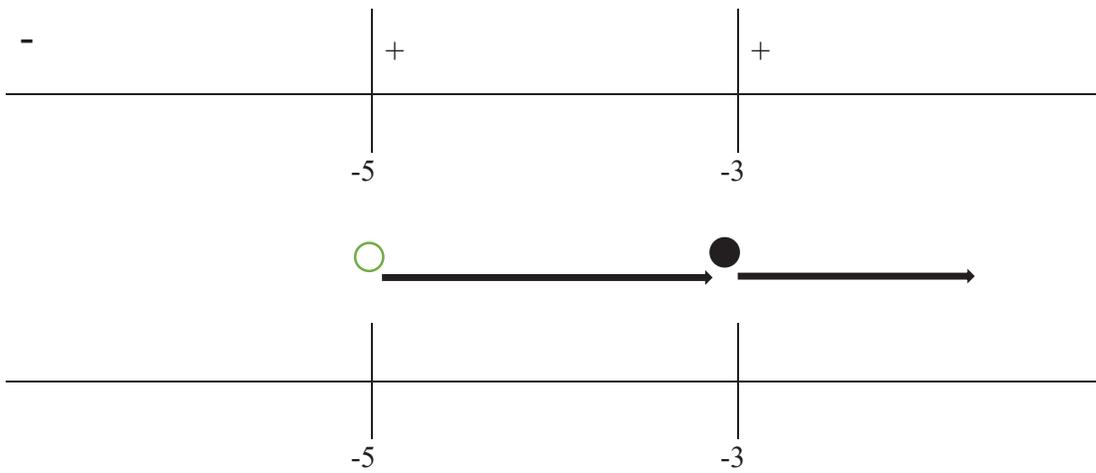
Answer: $(-5, -3] \cup [-3, \infty)$

3. $\dfrac{x^2 - 49}{x^2 + 13x + 42} \leq 0$

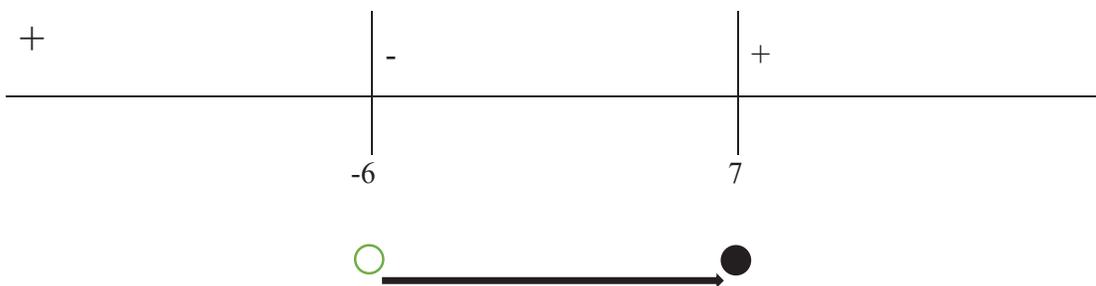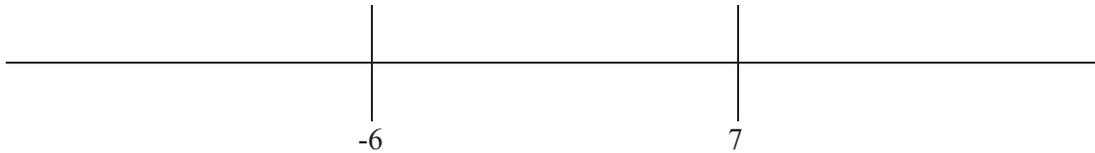$\dfrac{(x+7)(x-7)}{(x+6)(x+7)} \leq 0$

$\dfrac{x-7}{x+6} \leq 0$

X-7=0   x+6=0

x=7   x=-6

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 +              │  -              │  +
                │                 │
────────────────┼─────────────────┼────────────────
                │                 │
               -6                 7
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         ○━━━━━━━━━━━━━━━━━━━━━━━●
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Note: Practice Personal Hygiene protocols at all times

                    -6   7

Answer: $(-6, 7]$

ACTIVITY 3

1. Sayl Corporation experts on the sale of sails used in small boats. Their monthly revenue (in thousands) for the nth week after they opened is given by the equation $S = \frac{120t}{t^2+100}$.

a. What are their sales in their 5th week?

$S = \frac{120t}{t^2+100}$.

$S = \frac{120(5)}{5^2+100}$.

$S = \frac{600}{25+100}$.

$S = \frac{600}{125}$.

$S = 4.8 \text{ or } 4{,}800 \text{ sails}$

Answer: The sales will be 4,800 sails after 5 weeks.

b. What are their sales after a quarter?

$S = \frac{120t}{t^2+100}$.

$S = \frac{120(12)}{12^2+100}$.

$S = \frac{1440}{144+100}$.

$S = \frac{1440}{244}$.

$S = 5.90 \text{ or } 5{,}900 \text{ sails}$

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Note: Practice Personal Hygiene protocols at all times

Answer: The sales will be 5,900 sails after a quarter.

c. What is their sales after half a year?

$S = \frac{120t}{t^2+100}.$

$S = \frac{120(24)}{24^2+100}.$

$S = \frac{2880}{576+100}.$

$S = \frac{2880}{676}.$

$S = 4.26 \; or \; 4,260 \; sails$

Answer: The sales will be 4,260 sails after half a year.

d. In which week would the sale (s)have been 6?(note that the sales is express in thousands)

$S = \frac{120t}{t^2+100}.$

$6 = \frac{120t}{t^2+100}.$

$6(t^2 + 100) = 120t$

$. \, 6(t^2 + 100) = 120t$

$. \, 6t^2 + 600 = 120t$

$6t^2 - 120t + 600 = 0$

$t^2 - 20t + 100 = 0$

$(\text{x-10})^2$

X=10

Answer: it takes 10 weeks for the sale to reach 6,000 sails.

Note: Practice Personal Hygiene protocols at all times

e. In which week would the sale (s)have been 8?(note that the sales is express in thousands)

$$S = \frac{120t}{t^2+100}.$$

$$8 = \frac{120t}{t^2+100}.$$

$$8(t^2 + 100) = 120t$$

$$.\, 8(t^2 + 100) = 120t$$

$$.\, 8t^2 + 800 = 120t$$

$$8t^2 - 120t + 800 = 0$$

$$t^2 - 15t + 100 = 0$$

(x-20)(x+5)

X=20

Answer: it takes 20 weeks for the sale to reach 8,000 sails.

Note: Practice Personal Hygiene protocols at all times