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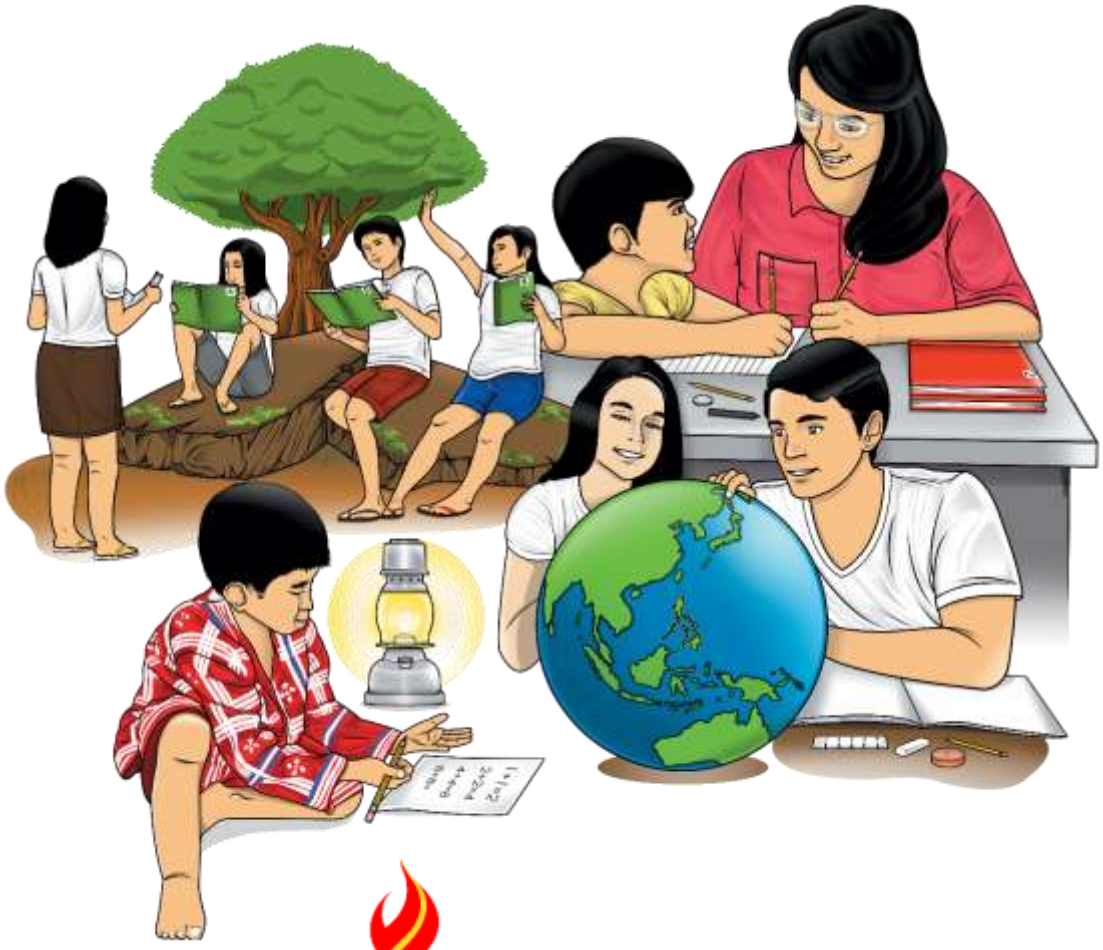
Mathematics
Quarter 1 – Module 3
Illustrating Rational Algebraic Expressions



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Secretary: Leonor Magtolis Briones
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Development Team of the Module

Writers:	Emmanuel S. Saga, Genevieve B. Estal
Content Editor:	Reechen Mae A. Piamonte
Language Editor:	Merjorie G. Dalagan
Reviewers:	Nilo B. Montaño, Lilibeth S. Apat, Liwayway J. Lubang, Rhodora C. Luga, Lee C. Apas, Jenny O. Pendica, Vincent Butch S. Embolode
Illustrator:	Genevieve B. Estal
Layout Artist:	Jake D. Fraga, Fritch A. Paronda
Management Team:	Francis Cesar B. Bringas, Isidro M. Biol, Jr., Rhea J. Yparraguirre Maripaz F. Magno, Josephine Chonie M. Obseñares, Josita B. Carmen, Celsa A. Casa, Regina Euann A. Puerto, Bryan L. Arreo, Lieu Gee Keeshia C. Guillen, Leopardo P. Cortes Claire P. Gonzaga

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Department of Education – Caraga Region
Office Address: Learning Resource Management Section (LRMS)
J.P. Rosales Avenue, Butuan City, Philippines 8600
Tel. No./Telefax No.: (085) 342-8207 / (085) 342-5969
E-mail Address: caraga@deped.gov.ph

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Mathematics
Quarter 1 – Module 3
"Illustrating Rational Algebraic Expressions"

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

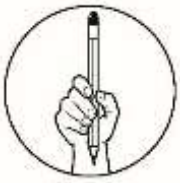
This module was designed and written for you to answer the activity you've missed while you are away from school. This module will help you define, identify, illustrate rational algebraic expressions, and relate its concepts in real-life situation. The scope of this module can be used in many different learning situations. Throughout this module, you will be provided with varied activities to process your knowledge and skills acquired, deepen and transfer your understanding of the rational algebraic expressions. Activities are arranged accordingly to correspond with your learning needs.

This module contains:

Lesson 1: Illustrating Rational Algebraic Expressions

After going through this module, you are expected to:

1. define rational algebraic expressions;
2. identify rational algebraic expressions;
3. evaluate rational algebraic expressions; and
4. relate rational algebraic expressions in real-life situation.



What I Know

Choose the letter of the correct answer. Write your answer on a separate sheet.

1. What do you call an expression in fraction form in which the numerator and the denominator are polynomials?
   A. rational algebraic equation
   B. linear algebraic expression
   C. rational algebraic expression
   D. linear algebraic equation

2. In a rational algebraic expression written in the form of $\frac{P}{Q}$, where P and Q are polynomials, the polynomial Q is equal to any number except ____.
   A. 0
   B. 1
   C. 2
   D. 3

3. Which of the following is a rational algebraic expression?

A. $\frac{6}{x-1}$

B. $\frac{2-\sqrt{x}}{4-x}$

C. $\frac{4+\frac{3}{x}}{y-2}$

D. $\frac{1-x}{1+\frac{1}{x}}$

4. What value of x will make the rational algebraic expression $\frac{5x+3}{x-6}$ undefined?

A. -6

B. $-\frac{3}{5}$

C. $\frac{3}{5}$

D. 6

5. What is the value of the rational expression $\frac{2x+1}{x}$ when $x = 1$?

A. 2

B. 3

C. 4

D. 5

6. What is the value of the expression $\frac{x^2+5x}{x^2+1}$ when $x = -1$?

A. -2

B. -1

C. 0

D. 1

7. Which of the following represents a ratio of two polynomials?

A. $(x + 1) + (x - 3)$

B. $(x + 1) - (x - 3)$

C. $(x + 1)(x - 3)$

D. $\frac{(x+1)}{(x-3)}$

8. Which of the following is a rational algebraic expression with a monomial in the numerator and a binomial in the denominator?

A. $\frac{d}{t}$

B. $\frac{x+1}{y}$

C. $\frac{x}{6x-5}$

D. $\frac{3x-9}{x-3}$

9. A speedy biker can travel 5 km per t hours. Which of the following expressions best illustrates the situation?

A. $5t$

B. $5t^{\frac{1}{2}}$

C. $\frac{t}{5}$

D. $\frac{5}{t}$

10. Vince can complete his school activity in x hours. What part of the activity can be completed by Vince after 4 hours?

A. $4x$

B. $\frac{4}{x}$

C. $x - 4$

D. $x + 4$

11. What is the value of x that will make the expression $\frac{x^4+2x+1}{x^2+2x+1}$ undefined?

A. -1
B. 0
C. 1
D. 2

12. Which of the following represents the phrase "The ratio of twice the sum of x and y to the difference of x and twice y"?

A. $\frac{2x+y}{x-2y}$
B. $\frac{2(x+y)}{x-2y}$
C. $\frac{2x+y}{2(x-y)}$
D. $\frac{2x+2y}{2x-2y}$

13. Which of the following satisfies the phrase "The sum of five and one third of a number n divided by the sum of twice a number y and 3"?

A. $\frac{5+\frac{1}{3}n}{2y+3}$
B. $\frac{5+\frac{1}{3}n\div 2y}{3}$
C. $\frac{5\frac{1}{3}+n}{2(y+3)}$
D. $\frac{(5+\frac{1}{3}n)\div 2y}{3}$

14. If Jed can accomplish the school activity in five hours while Vince can accomplish the same activity in x hours, which expressions below represents the rate of Jed and Vince working together?

A. $5+x$
B. $x-5$
C. $\frac{1}{5}-\frac{1}{x}$
D. $\frac{1}{5}+\frac{1}{x}$

15. The formula for finding the circumference of a circle is $C=2\pi r$, where C is the circumference and r is the radius of the circle. What is the formula in finding the radius of the circle given its circumference?

A. $\frac{C}{\pi}$
B. $\frac{C}{2\pi}$
C. $\frac{2C}{\pi}$
D. $\frac{C\pi}{2}$

Lesson 1 Illustrating Rational Algebraic Expressions

The speed of a running motorcycle can be computed by the ratio of its distance travelled and the elapsed time. How can you write this into a mathematical expression?

In your previous grade level, recall that ratio shows the comparative sizes of two or more values such as 1:4, which can also be written in fraction form $\frac{1}{4}$. Other examples of ratio in fraction form are 1/8, $\frac{1}{3}$, $\frac{a}{b}$ or $\frac{x}{y}$.

Let us start this lesson by reviewing the concepts in translating verbal phrases to mathematical expressions and identifying polynomials which you had learned in your Mathematics 7.

Enjoy learning!

What's In

A. MATCH IT TO ME

Match the verbal phrases in column (A) to the corresponding mathematical phrases in column (B). Write the letter of your answer to the separate sheet of paper.

A. Verbal Phrase	B. Mathematical Phrase
1. The sum of a number n and nine	A. $\sqrt[3]{n} - 5$
2. The product of n and the number eight	B. $n - 21$
3. The ratio of distance (d) and time (t)	C. $n + 9$
4. The difference of a number n and twenty-one	D. $\frac{d}{t}$
5. The cube root of a number n decreased by five	E. $\sqrt{n} + 21$
	F. $8n$

Questions:

1. What must be considered in translating verbal phrases to mathematical phrases?
2. Will you consider these mathematical phrases as polynomials? Why or why not?
3. How will you describe a polynomial?

B. IDENTIFYING POLYNOMIALS

Identify whether the expression is a polynomial or not? Write **P** if it is polynomial and **NP** if it is not. Write your answer on a separate sheet of paper.

1. $x + 3$
2. x^{-4}
3. $2d$
4. $3c^2 + 2c$
5. $3d^{-2} + 1$
6. $\sqrt{x} + 2$

Questions:

1. Were you able to identify each expression?
2. How did you classify a polynomial from not a polynomial?
3. What difficulty did you encounter in determining polynomials?
4. What expression can be formed when you write two expressions from the activity in fraction form?

What's New

ACTIVITY: PAIR APPEAR

Below are the list of expressions grouped into columns. Pair expressions in column A and column B to illustrate a ratio of two expressions. The answer of the first item is provided.

	Column A	**Column B**	$\frac{\textbf{Column A}}{\textbf{Column B}}$
1	6	$x - 3$	$\frac{6}{x-3}$
2	$y^2 - 1$	$y^3 - 3$	
3	$18n + 1$	$n^2 + n - 2$	
4	$3x - \sqrt{y}$	$5\sqrt{x}$	
5	$2x^{-2} - 3$	$x + 6$	
6	$3 - z^3$	$z^{-2} + 5$	

Questions:

1. What expressions are formed in items 1, 2, and 3? Are these expressions in fraction form?
2. What have you noticed in the numerator and denominator of the expressions formed in items 1, 2 and 3? Are the numerators and denominators of these expressions polynomials?
3. What have you noticed in the numerator and denominator of the expressions formed in items 4, 5 and 6? Are the numerators and denominators of these expressions polynomials?
4. What have you noticed in the terms of the numerator and denominator of items 4, 5, and 6? What are their exponents?

What is It

A **rational algebraic expression** is an expression that can be written in the form $\frac{P}{Q}$ where $\boldsymbol{P}$ and $\boldsymbol{Q}$ are polynomials and $\boldsymbol{Q}$ must not be equal to 0 ($Q \neq 0$). In other words, a rational algebraic expression is an expression whose numerator and denominator are polynomials. From the previous activity, expressions formed in items 1,2 and 3 are rational algebraic expressions because the numerator and the denominator are both polynomials. On the other hand, expressions formed in items 4, 5, and 6 are not rational algebraic expressions because the numerator and denominator of the expressions are not polynomials.

How will you know that the expression is a rational algebraic expression? For you to recognize rational algebraic expressions, examine the following examples.

Presentation 1:

Check these expressions.

$$\frac{6}{x-3} \qquad \frac{y^2-1}{y^3-3} \qquad \frac{18n+1}{n^2+n-2} \qquad \frac{5x^2+6x-11}{1}$$

All of the expressions here are rational algebraic expressions since these contain polynomial expressions in both numerator and denominator, respectively.

Presentation 2:

Check these expressions:

$$\frac{3x-\sqrt{y}}{5\sqrt{x}} \qquad \frac{3x-\sqrt{y}}{x+6} \qquad \frac{2x^{-2}-3}{x+6} \qquad \frac{2x^{-2}-3}{5\sqrt{x}} \qquad \frac{3+\frac{1}{2-x}}{z^{-2}+5}$$

All of the expressions here are not rational algebraic expressions since the expressions contain irrational numbers ($\sqrt{x}$ and $\sqrt{y}$) and variables having negative exponents (x^{-2} and z^{-3}), which are not polynomials.

Here's a useful checklist in identifying whether the expression is a rational algebraic expression:

- ✓ The expression must be in fraction form.
- ✓ The expression must have in its numerator and denominator a constant, a variable, or a combination of both, that are polynomial expressions.
- ✓ The expression must not have a negative exponent, a radical sign or a fraction exponent in the variable/s in both numerator and denominator.

Recall that the rational algebraic expression is a fraction containing polynomials in both numerator and denominator, provided that the denominator **must not be equal to zero**. The denominator cannot be zero because a division of 0 is **undefined or meaningless**. In rational algebraic expressions, you need to pay attention to what values of the variables that will make the denominator equal to 0. These values are called **excluded values**. How are you going to determine the excluded value/s in a rational algebraic expression?

Steps in Determining the Excluded Values:

(Study Tip: Just pay attention to the denominator of the expression to determine the excluded values.)

Step 1: Let the expression in the denominator be equal to 0.

Step 2: Solve the equation to determine the value/s of the variable.

Below are the illustrative examples that will help you understand it better.

Illustrative Example 1:

Identify the value of x that will make $\frac{6}{x-3}$ undefined.

Solution:

Step 1: Let the expression in the denominator be equal to 0.

$$x - 3 = 0$$

Step 2: Solve the equation to determine the value/s of the variable.

$x - 3 = 0$	(Given)
$x - 3 + 3 = 0 + 3$	(Add both sides by 3 by Addition Property of Equality)
$x + 0 = 3$	(by simplifying)
$\boldsymbol{x = 3}$	

This means that when $x = 3$, the expression $\frac{6}{x-3}$ is undefined. Thus, $x = 3$ is an excluded value in the given rational algebraic expression, or in other words, x cannot be 3. What happens if you substitute 3 to the expression?

$$\frac{6}{x-3} = \frac{6}{3-3} = \mathbf{\frac{6}{0}}$$

Since division of any number by 0 is undefined, therefore 3 is an excluded value for this rational algebraic expression.

Illustrative Example 2:

Identify the value/s of n that will make $\frac{18n+1}{n^2+n-2}$ undefined.

Solution:

Step 1: Let the expression in the denominator be equal to 0.

$$n^2 + n - 2 = 0$$

Step 2: Solve the equation to determine the value/s of the variable.

	$n^2 + n - 2 = 0$	(Given)
	$(n + 2)(n - 1) = 0$	(by factoring $n^2 + n - 2 = 0$)
$n + 2 = 0$	$n - 1 = 0$	(by Zero Product Property)
$n + 2 + (-2) = 0 + (-2)$	$n - 1 + 1 = 0 + 1$	(by Addition Property of Equality)
$n = -2$	$n = 1$	(by Simplifying)

This means that n cannot be -2 nor 1. What happens if you substitute that values to the expression?

If $n = -2$:

$$\frac{18n + 1}{n^2 + n - 2} = \frac{18(-2) + 1}{(-2)^2 + (-2) - 2} = \frac{-36 + 1}{4 - 2 - 2} = \mathbf{\frac{-35}{0}}$$

If $n = 1$:

$$\frac{18n + 1}{n^2 + n - 2} = \frac{18(1) + 1}{(1)^2 + (1) - 2} = \frac{18 + 1}{1 + 1 - 2} = \mathbf{\frac{19}{0}}$$

Since division of any number by 0 is undefined, therefore -2 and 1 are excluded values for this rational algebraic expression.

You can verify that if the excluded value/s is substituted in the expression, it always ends up to division by 0. You have to bear in your mind that there are some values that will make the expression defined, too. How are you going to inspect it? The process is called evaluating the expression.

Illustrative Example 1:

Evaluate the expression $\frac{y^2-1}{y^3-3}$ when $y = 2$.

Solution:

Step 1: Replace the variable y with the given value.

$$\frac{y^2-1}{y^3-3} = \frac{(2)^2-1}{(2)^3-3} \quad \text{(by substituting } y = 2\text{)}$$

Step 2: Simplify the numerator and the denominator.

$$\frac{(2)^2-1}{(2)^3-3} = \frac{4-1}{8-3}$$
$$= \frac{\mathbf{3}}{\mathbf{5}}$$

Thus, when $y = 2$, the expression $\frac{y^2-1}{y^3-3}$ is equal to $\frac{3}{5}$.

Illustrative Example 2:

Evaluate the expression $\frac{5x^2+6x-11}{1}$ when $x = 2$.

Solution:

Step 1: Replace the variable x with the given value.

$$\frac{5x^2+6x-11}{1} = \frac{5(2)^2+6(2)-11}{1} \quad \text{(by substituting } x = 2\text{)}$$

Step 2: Simplify the numerator and the denominator.

$$\frac{5(2)^2+6(2)-11}{1} = \frac{5(4)+6(2)-11}{1}$$
$$= \frac{20+12-11}{1}$$
$$= \frac{21}{1}$$
$$= 21$$

Thus, when $x = 2$, the expression $\frac{5x^2+6x-11}{1}$ is equal to 21.

Try applying rational algebraic expression in real-life situation. Consider these illustrative examples:

Illustrative Example 1:

Vannessa can finish writing a module in x hours, while his brother Ryan can finish writing the same module in y hours. Write an expression that will illustrate their rate of work to finish writing the module.

This can be illustrated using a table:

	Time (in hours)	$\frac{\textbf{part of work}}{\textbf{hour}}$
Vannessa	x	$\frac{1}{x}$
Ryan	y	$\frac{1}{y}$

You can represent $\frac{1}{x}$ for Vannessa to accomplish a work per hour since she can finish writing one module alone in x hours. On the other hand, you can represent $\frac{1}{y}$ for Ryan to accomplish a work per hour since he can finish writing one module alone in y hours.

Illustrative Example 2:

The area of a rectangle is $(x^2 - 121)$ square units while its width measures $(x + 11)$ units. Illustrate a rational algebraic expression in finding the length of the rectangle.

Solution:

Recall that the formula in finding the length given the area and the width of the rectangle is

$$length = \frac{Area_{rectangle}}{width}$$

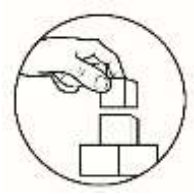
Substituting the area and the width of the rectangle,

$$length = \frac{Area_{rectangle}}{width} = \frac{x^2 - 121}{x + 11}$$

Then the length of the rectangle can be illustrated as

$$\frac{x^2 - 121}{x + 11}$$

There are many ways to illustrate real-life situations depending on what technique interests you most. You need to develop your understanding about illustrating rational algebraic expression through accomplishing the succeeding activities of this module.



What's More

Activity 1: You Belong with Me

Classify the different expressions below as to which set of expressions they belong. Write the expression in the appropriate column.

$\frac{1-y}{y^7}$ $\quad\quad$ $\frac{\sqrt{7}x}{x-7}$ $\quad\quad$ $\frac{b^4}{\sqrt[7]{c^5}}$

$\frac{x-y^{\frac{2}{3}}}{7y-7}$ $\quad\quad$ $\frac{2x^2+5}{x^2-7x+3}$ $\quad\quad$ $\frac{2x+1}{3x^{-2}-7x+1}$

Rational Algebraic Expressions	Not Rational Algebraic Expressions

Activity 2: "Excluded" Part of Me

Determine the excluded value/s that will make the given expression undefined.

1. $\frac{6x}{2x-4}$ $\quad\quad$ 2. $\frac{x^2+3x-5}{x^2-1}$ $\quad\quad$ 3. $\frac{x^3-4x^2+2x}{x^2-5x+6}$

Activity 3: Know My Value

Directions: Evaluate the rational algebraic expressions. Write your answer on your answer sheet.

_____1. $\frac{5x}{3x-9}$; $x = 4$

_____2. $\frac{y^2+4y+1}{y^2-1}$; $y = -2$

_____3. $\frac{z^3-4z^2+2z}{z^2-5z+6}$; $z = -3$

Activity 4: Represent Me

Represent the given phrases and statements into rational algebraic expression.

1. The sum of 3 and one third of a number n divided by the sum of thrice a number n and 7.

2. Miggy can complete his school math reviewer in t hours. What part of the work can be completed by Miggy after 4 hours?

3. Patricia can cook *adobo* in x hours, while her brother Joseph can cook the same recipe in y hours. Write an expression that will illustrate their rate of work in cooking *adobo*.

What I have learned

Fill in the Blanks

Complete the paragraph below by filling in the blanks with correct word/s or figure/s which you can choose from the box below. Each word or figure may be used repeatedly. Write your answer on a separate sheet.

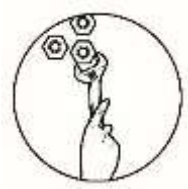
equal	zero	variable	evaluating	simplify
solve	negative	polynomials	undefined	substituted
division	excluded	numerator	denominator	fraction
	fractional exponent		P/Q	

A rational algebraic expression is an expression of the form _____, where P and Q are _____ and Q should not be equal to _____.

You can identify a rational algebraic expression if it is in _____ form, the _____ and denominator are polynomials, and does not have a _____exponent and a _____ in the variables in both numerator and denominator. The _____ of the rational algebraic expression cannot be zero because a division of 0 is _____ or meaningless. You need to pay attention to what values of the variable that will make the denominator equal to 0. These values are called_____ values. To determine the said values, you need to let the expression in the denominator be _____ to 0. Then, _____ the equation to determine the value/s of the variable.

You can verify that if the excluded value/s is _____ in the expression, it always ends up to the _____ by 0. You have to bear in your mind that there are some values that will make the expression defined, too. The process is called _____ the expression. The first step is to replace the variable with the given value. Second is to _____ the numerator and the denominator.

Rational algebraic expressions can be useful tools for representing real life situations and for finding answers to real problems. This best describes the distance-speed-time questions, and modeling multi-person work problems.



What I can Do

The Pandemic Problem

Read the problem below and answer the questions that follow.

In the year 2020, a disease named Corona Virus Disease 2019 (COVID-19) put the world in fear, declaring it into a pandemic. With the exponentially increasing COVID-19 cases in the world until at present, Enhanced Community Quarantine (ECQ) was set to contain persons through staying at home and banning mass gatherings to avoid transmission of the disease. As such, "barter system" came to exist in the marketing system. Cona prepared for this crisis through planting succulents for bartering it with her needs. She noticed that her rate of planting is that each $2b + 4$ *number of succulents are to be planted in* $b - 1$ *hours, where* b *is the number of persons who wanted to barter.*

Questions:

1. What rational algebraic expression will best represent the situation?
2. What is Cona's rate of planting succulents if there are 3 persons who wanted to barter succulents? how about if there are 7 persons who wanted to barter succulents?

Assessment

Read each questions carefully. Choose the letter of the correct answer and write it on a separate sheet of paper.

1. Which of the following terms is described as "the ratio of two polynomial expressions"?
   A. linear algebraic expression
   B. linear algebraic equation
   C. rational algebraic expression
   D. rational algebraic equation

2. In a rational algebraic expression written in the form of $\frac{P}{Q}$, where P and Q are polynomials, the polynomial Q must not be equal to _____.

A. -1 C. 1

B. 0 D. 2

3. Which of the following is considered a rational algebraic expression?

A. $\frac{3n}{\sqrt{n}}$ C. $\frac{2x^{-2}-7x}{n^2}$

B. $\frac{3n+9}{n^3-2}$ D. $\frac{4x+11}{n^{-2}-1}$

4. Which of the following is an example of a rational algebraic expression?

A. $\frac{3\,n^2}{15\sqrt[3]{n}}$ C. $\frac{5x^3+4}{2n+3}$

B. $\frac{3n+\sqrt{n}}{2+3n}$ D. $\frac{3x^{-5}}{2n^{-2}+1}$

5. Evaluate the expression $\frac{2x+5}{3x}$ when $x = -1$.

A. -1 C. 1

B. 0 D. 2

6. What is the value of the expression $\frac{x^2-5x+12}{x^2-1}$ when $x = 2$?

A. 1 C. 3

B. 2 D. 4

7. Which of the following is a rational algebraic expression having trinomial on both numerator and denominator?

A. $\frac{d-3}{d-5}$ C. $\frac{x^2+2x+1}{x-3}$

B. $\frac{x+1}{y+1}$ D. $\frac{x+2y+z}{6x-5y+z}$

8. Which of the following represents a ratio of two polynomials?

A. $(2x+1)-(x-4)$ C. $(x+1)(x-3)$

B. $(x-5)+(5x-8)$ D. $\frac{(4x-1)}{(2x-3)}$

9. Which of the following is a rational algebraic expression that illustrates binomial in numerator and trinomial in denominator?

A. $\frac{d+1}{t+1}$ C. $\frac{x^2+x+1}{2x^2-9}$

B. $\frac{x+1}{x^2+x+1}$ D. $\frac{3x^2-2x-9}{x^3+2x-3}$

10. Vanness can accomplish his school project in z hours. What part of his school project can be completed by Vanness after 2 hours?

A. $z+2$ C. $2z$

B. $z-2$ D. $\frac{z}{2}$

11. The following are rational algebraic expressions EXCEPT

A. $\frac{4}{y+2}$

B. $\frac{3x+8}{2x^4-x^2}$

C. $\frac{5+3x^{\frac{3}{2}}}{x+10}$

D. $\frac{4x-10}{1}$

12. What is the value of x that will make the expression $\frac{x^4-3x+5}{x^2-6x+9}$ undefined?

A. 1
B. 2
C. 3
D. 4

13. Which of the following represents the phrase "The ratio of thrice the difference of twice x and thrice y to the difference of thrice x and y"?

A. $\frac{3(2x+3y)}{3(x-y)}$

B. $\frac{3(2x-y)}{3(x-y)}$

C. $\frac{3(2x-3y)}{3x-y}$

D. $\frac{3(2x)-3y}{3x-y}$

14. Marie takes x hours to plant 20 flower bulbs. Francine takes y hours to plant same number of flower bulbs. Which expressions below represents the rate of Marie and Francine working together?

A. $x+y$
B. $x-y$
C. $\frac{1}{y}+\frac{1}{x}$
D. $\frac{1}{x}-\frac{1}{y}$

15. The formula for finding the area of a rectangle is $A = lw$, where l is the length and w is the width of the rectangle. What is the formula in finding the length (l) of the rectangle given its area (A)?

A. $\frac{A}{l}$

B. $\frac{A}{w}$

C. $\frac{w}{A}$

D. $\frac{l}{A}$

Additional Activity

Abby and Ben were asked to find the real numbers for which the rational algebraic expression $\frac{x+1}{(x-1)(3x+2)}$ is undefined. Their solutions are shown below together with their explanation.

Abby's Solution	**Ben's Solution**
$\frac{x+1}{(x-1)(3x+2)}$ $(x-1)(3x+2)=0$ $x-1=0$ | $3x+2=0$ $x-1+1=0+1$ | $3x+2-2=0-2$ $x=1$ | $x=-\frac{2}{3}$ 1 and $-\frac{2}{3}$ are the excluded values of the given rational expression, as these values will make the expression undefined.	$\frac{x+1}{(x-1)(3x+2)}$ $x+1=0$ $x+1-1=0-1$ $x=-1$ Hence, x cannot be equal to -1 since it will make the rational expression undefined.

Who do you think presented a correct answer and solution? Write your answer on a separate sheet of paper.

Answer Key

What I Know

1. C
2. A
3. A
4. D
5. B
6. A
7. D
8. C
9. D
10. B
11. A
12. B
13. A
14. D
15. B

What's In

A.

1. C
2. F
3. D
4. B
5. A

B.

1. P
2. NP
3. P
4. P
5. NP
6. NP

What's New

1. $\frac{6}{x-3}$
2. $\frac{y^2-1}{y^3-3}$
3. $\frac{18n+1}{n^2+n-2}$
4. $\frac{3x-\sqrt{y}}{5\sqrt{x}}$
5. $\frac{2x^{-2}-3}{x+6}$
6. $\frac{3-z^3}{z^{-2}+5}$

Questions:

1. fractions; yes
2. polynomials; yes
3. not polynomials; no
4. radical expressions and negative exponents; negative

What's More

Activity 1

Rational Algebraic Expressions:

$$\frac{1-y}{y^7}, \frac{\sqrt{7}x}{x-7}, \frac{2x^2+5}{x^2-7x+3}$$

Not Rational Algebraic Expressions:

$$\frac{b^4}{\sqrt[7]{c^5}}, \frac{x-y^{2/3}}{7y-7}, \frac{2x+1}{3x^{-2}-7x+1}$$

Activity 2

1. $x = 2$
2. $x = 1 \text{ or } x = -1$
3. $x = 2 \text{ or } x = 3$

Activity 3

1. $\frac{20}{3}$
2. -1
3. $-\frac{23}{10}$

Activity 4

1. $\frac{3+\frac{1}{3}n}{3n+7}$
2. $\frac{t}{4}$
3. Patricia: $\frac{1}{x}$; Joseph: $\frac{1}{y}$

What I Have Learned

(*in order*) $\frac{P}{Q}$; polynomials; zero; fraction; numerator; negative; fractional exponent; denominator; undefined; excluded; equal; solve; substituted; division; evaluating; simplify

What I Can Do

1. $\frac{2b+4}{b-1}$
2. 5; 3

Assessment

1. C
2. B
3. B
4. C
5. A
6. B
7. D
8. D
9. B
10. D
11. C
12. C
13. C
14. C
15. B

Additional Activity

Abby.

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For inquiries or feedback, please write or call:

Department of Education – Bureau of Learning Resource
Ground Floor, Bonifacio Building, DepEd Complex
Meralco Avenue, Pasig City, Philippines 1600

Telefax. Nos.: (632) 8634-1072; 8634-1054; 8631-4985

Email Address: blr.lrqad@deped.gov.ph * blr.lrpd@deped.gov.ph