8

Mathematics

Quarter 1 – Module 5B
Adding and Subtracting Similar and Dissimilar Rational Algebraic Expressions

ALTERNATIVE DELIVERY MODE

Mathematics – Grade 8
Alternative Delivery Mode
Quarter 1 – Module 5B Adding and Subtracting Rational Algebraic Expressions
First Edition, 2020

Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

Development Team of the Module

Writer: Jenny O. Pendica, Alicia E. Gonzales

Language Editor: Merjorie G. Dalagan

Content Evaluator: Alsie Mae M. Perolino

Layout Evaluator: Jake D. Fraga

Reviewers: Rhea J. Yparraguirre, Nilo B. Montaño, Lilibeth S. Apat, Liwayway J. Lubang, Rhodora C. Luga, Lee C. Apas, Vincent Butch S. Embolode, Emmanuel S. Saga

Management Team: Francis Cesar B. Bringas
Isidro M. Biol, Jr.
Maripaz F. Magno
Josephine Chonie M. Obseñares
Josita B. Carmen
Celsa A. Casa
Regina Euann A. Puerto
Bryan L. Arreo
Elnie Anthony P. Barcena
Leopardo P. Cortes

Printed in the Philippines by ________________________

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

8

Mathematics

Quarter 1 – Module 5B
Adding and Subtracting Similar and Dissimilar Rational Algebraic Expressions

DEPARTMENT OF EDUCATION

Introductory Message

For the facilitator:

Welcome to the Mathematics 8 Alternative Delivery Mode (ADM) Module on Adding and Subtracting Similar and Dissimilar Rational Algebraic Expressions!

This module was collaboratively designed, developed and reviewed by educators both from public and private institutions to assist you, the teacher or facilitator in helping the learners meet the standards set by the K to 12 Curriculum while overcoming their personal, social, and economic constraints in schooling.

This learning resource hopes to engage the learners into guided and independent learning activities at their own pace and time. Furthermore, this also aims to help learners acquire the needed 21st century skills while taking into consideration their needs and circumstances.

In addition to the material in the main text, you will also see this box in the body of the module:

Notes to the Teacher

This contains helpful tips or strategies that will help you in guiding the learners.

As a facilitator, you are expected to orient the learners on how to use this module. You also need to keep track of the learners' progress while allowing them to manage their own learning. Furthermore, you are expected to encourage and assist the learners as they do the tasks included in the module.

For the learner:

Welcome to the Mathematics 8 Alternative Delivery Mode (ADM) Module on Adding and Subtracting Similar and Dissimilar Rational Algebraic Expressions!

This module was designed to provide you with fun and meaningful opportunities for guided and independent learning at your own pace and time. You will be enabled to process the contents of the learning resource while being an active learner.

This module has the following parts and corresponding icons:

What I Need to Know	This will give you an idea of the skills or competencies you are expected to learn in the module.
What I Know	This part includes an activity that aims to check what you already know about the lesson to take. If you get all the answers correct (100%), you may decide to skip this module.
What's In	This is a brief drill or review to help you link the current lesson with the previous one.
What's New	In this portion, the new lesson will be introduced to you in various ways; a story, a song, a poem, a problem opener, an activity or a situation.
What is It	This section provides a brief discussion of the lesson. This aims to help you discover and understand new concepts and skills.
What's More	This comprises activities for independent practice to solidify your understanding and skills of the topic. You may check the answers to the exercises using the Answer Key at the end of the module.
What I Have Learned	This includes questions or blank sentence/paragraph to be filled in to process what you learned from the lesson.
What I Can Do	This section provides an activity which will help you transfer your new knowledge or skill into real life situations or concerns.
Assessment	This is a task which aims to evaluate your level of mastery in achieving the learning competency.
Additional Activities	In this portion, another activity will be given to you to enrich your knowledge or skill of the lesson learned.
Answer Key	This contains answers to all activities in the module.

At the end of this module you will also find:

References	This is a list of all sources used in developing this module.

The following are some reminders in using this module:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer *What I Know* before moving on to the other activities included in the module.
3. Read the instruction carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your teacher/facilitator once you are through with it.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator. Always bear in mind that you are not alone.

We hope that through this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it!

What I Need to Know

This module covers key concepts of operations on rational algebraic expressions divided into lessons. This material, gives you the opportunity to use your prior knowledge and skills in dealing with operations on rational algebraic expressions. You are also given varied activities to process your knowledge and skills learned to deepen and transfer your understanding of the different lessons.

This module is divided into the following lessons:

Lesson 1: Adding and Subtracting Similar Rational Algebraic Expressions; and

Lesson 2: Adding and Subtracting Dissimilar Rational Algebraic Expressions.

In going through this module, you are expected to:

1. Define similar rational algebraic expressions;
2. Add and subtract similar rational algebraic expressions;
3. Define dissimilar rational algebraic expressions;
4. Add and subtract dissimilar rational algebraic expressions; and
7. Relate operations of rational algebraic expressions in real-life situations.

What I Know

Directions: Choose the correct answer. Write your answer on a separate sheet of paper.

1. Give the Least Common Denominator (LCD) of $\frac{3}{15y^2}$ and $\frac{5}{36y^4}$.
   A. $36y^2$
   B. $36y^4$
   C. $90y^2$
   D. $180y^4$

2. Find the LCD of $\frac{7}{8-2a}$and $\frac{2}{4-a}$.
   A. $(4-a)$
   B. $2(4-a)$
   C. (a^2+64)
   D. $(64-a^2)$

3. Give the sum of $\frac{a}{b}+\frac{a}{b}$.
   A. $\frac{a^2}{b^2}$
   B. $\frac{a^2}{b}$
   C. $\frac{2a}{2b}$
   D. $\frac{2a}{b}$

4. Find simplified form of $\frac{2x}{2}+\frac{x}{3}$.
   A. $\frac{4x}{3}$
   B. $\frac{5x}{3}$
   C. $\frac{6x}{3}$
   D. $\frac{7x}{3}$

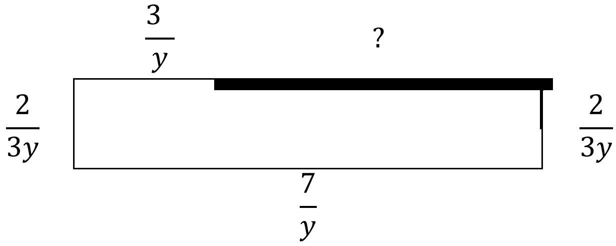
5. Perform the indicated operation $\frac{x-2}{3}-\frac{x+2}{2}$.
   A. $\frac{x+1}{6}$
   B. $\frac{x+5}{6}$
   C. $\frac{x-6}{6}$
   D. $\frac{-x-10}{6}$

6. Look for the sum of $\frac{3x-5}{2}+\frac{x+3}{2}$.
   A. $x-1$
   B. $x-2$
   C. $x-3$
   D. $x-4$

7. Given $\frac{x+1}{3}$ as one addend of the sum $\frac{8x-7}{3}$, find the other addend.
   A. $\frac{7x-4}{3}$
   B. $\frac{7x-6}{3}$
   C. $\frac{7x-8}{3}$
   D. $\frac{7x-10}{3}$

8. Find the sum of $\frac{3}{2x}+\frac{5}{x-2}$.
   A. $\frac{8}{2x(x-2)}$
   B. $\frac{8x-10}{2x(x-2)}$
   C. $\frac{13x-2}{2x(x-2)}$
   D. $\frac{13x-6}{2x(x-2)}$

9. Subtract $\frac{r+9}{r-4}$ from $\frac{3r+1}{r-4}$.
   A. 2 C. 6
   B. 4 D. 8
10. Using the LCD 6, look for the equivalent rational algebraic expression of $\frac{x+1}{3}$.
   A. $\frac{2x+1}{6}$ C. $\frac{6x+1}{3}$
   B. $\frac{2x+2}{6}$ D. $\frac{6x+6}{3}$
11. Look for the equivalent rational algebraic expression of each of $\frac{a+1}{a}$ and $\frac{b+1}{b}$ if the LCD is ab.
   A. $\frac{ab+1}{ab}, \frac{ab+b}{ab}$ C. $\frac{ab+b}{ab}, \frac{ab+a}{ab}$
   B. $\frac{ab-a}{ab}, \frac{ab-1}{ab}$ D. $\frac{ab-b}{ab}, \frac{ab-a}{ab}$
12. Write as one fraction and simplify $\frac{x}{x-1} - \frac{2}{x+1}$.
   A. $\frac{x^2+x+2}{(x-1)(x+1)}$ C. $\frac{x^2-x-2}{(x-1)(x+1)}$
   B. $\frac{x^2-x+2}{(x-1)(x+1)}$ D. $\frac{x^2+x-2}{(x-1)(x+1)}$
13. Find the truth about similar rational algebraic expressions among the following statements.
   A. The expressions have prime numerators.
   B. The expressions have prime denominators.
   C. The expressions have the same numerators.
   D. The expressions have the same denominators.
14. Determine the truth about dissimilar rational algebraic expressions among the following statements.
   A. The expressions have different numerators.
   B. The expressions have non-zero numerators.
   C. The expressions have different denominators.
   D. The expressions have non-zero denominators.
15. The rectangular plot for the carrots has the dimensions shown below. Find how long the side labeled with a question mark.



   A. $\frac{3}{y}$ C. $\frac{5}{y}$
   B. $\frac{4}{y}$ D. $\frac{6}{y}$

Lesson 1 Adding and Subtracting Similar Rational Algebraic Expressions

Farming is never out of fashion. It offers work, food, and security to many especially during trying times. Like other jobs, farming requires so much before enjoying the fruitful harvest. The land has to be plowed, seeds need to be germinated in a fertile soil, plants have to get enough sunlight and water, and plants have to be free from unwanted invaders. Like other jobs, it is tedious but rewarding.

But don't you know that farming uses mathematics inasmuch as other jobs do?

What's In

If there are similar fractions, certainly there are also similar rational algebraic expressions, the ones that have the same denominators. Recall adding and subtracting similar fractions.

A. Directions: Match items in Column A with the reduced forms in Column B.

Column A	Column B
1. $\frac{2}{16}$	A. 8
2. $\frac{18}{24}$	B. $\frac{1}{8}$
3. $\frac{16}{2}$	C. $\frac{3}{4}$
4. $\frac{10py}{60}$	D. p^2y
5. $\frac{py^2}{p^3y^3}$	E. $\frac{py}{6}$
	F. $\frac{1}{p^2y}$

B. Directions: Perform the indicated operations and reduce your answers to the lowest form. Write your answers on a separate sheet of paper.

1. $\frac{3}{15}+\frac{8}{15}$ 2. $\frac{7}{24}-\frac{1}{24}$ 3. $\frac{1}{6}-\frac{5}{6}+\frac{10}{6}$

Questions:

1. What did you do to reduce the expressions in Activity A?
2. What do you call all the groups of fractions in Activity B? Why?
3. Arrange the following steps of adding and subtracting similar fractions. Write a, b, c, and d to arrange them.

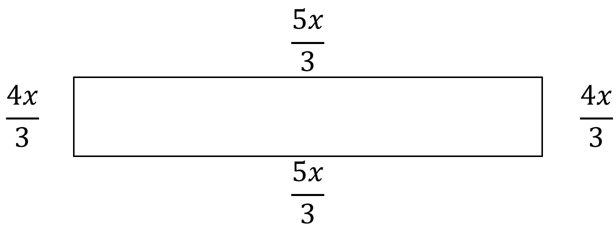
___________ Numerators are added or subtracted and the common denominator is copied.
___________ The fractions are combined into one fraction.
___________ Common factor or factors of the numerator and denominator is/are divided out.
___________ The numerators and denominators are expressed into prime factors.

What's New

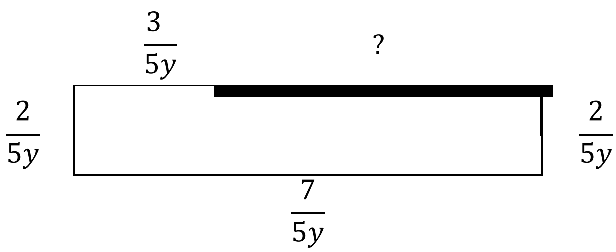
Situation: One fine Saturday morning, you are requested by your father to go with him to the farm that is just few meters away from home. In there, you saw a measuring stick. You asked your father, "Father what is this stick for?" Your father answered, "Oh! Good that you see that. I would like you to measure the distance around the plot that I prepared so that I would know the length of cyclone that I need to fence it".

Consider the situation above and supply what is asked in the illustration. Remember that $Side\ 1 + Side\ 2 + Side\ 3 + \cdots = Distance\ around\ the\ plot.$

1. Find the distance around the rectangular plot as illustrated.



2. Find how long the other side of the plot that is illustrated below.



Questions:

1. What should you call rational algebraic expressions that have the same denominators?
2. How did you answer Item 1?
3. How did you answer item 2?
4. Have you recognized the following as used in finding the answers of Items 2 and 3? Write Yes or No.

____________ Numerators are added or subtracted and the common denominator is copied.

____________ The fractions are combined into one fraction.

____________ Common factor or factors of the numerator and denominator is/are divided out.

____________ The numerators and denominators are expressed into prime factors.

5. Do you find similarities between the rules of adding & subtracting similar fractions and adding & subtracting similar rational algebraic expressions?

What is It

The previous activity allowed you to solve for perimeter and the missing side of the rectangle by adding and subtracting similar rational algebraic expressions just the way you add and subtract similar fractions. Observe as more examples of operating similar rational algebraic expressions will be shown to you.

Example 1: $\frac{8p}{3}+\frac{5p}{3}$

Solution

Step 1. Write the given as one expression.

$$\frac{8p}{3}+\frac{5p}{3} = \frac{8p+5p}{?}$$

Collect the numerators.

$$= \frac{8p+5p}{3}$$

Copy the common denominator.

Step 2. Combine like terms in the numerator by addition.

$$\frac{8p}{3}+\frac{5p}{3} = \frac{\mathbf{8}\boldsymbol{p}+5\boldsymbol{p}}{3}$$

Look for terms that have the same variables of the same exponent.

$$= \frac{13p}{3}$$

Add numerical coefficients and copy common variable.

Step 3. Express the sum in reduced form.

$$\frac{8p}{3}+\frac{5p}{3} = \frac{13p}{3}$$

There is no Greatest Common Factor (GCF) in the numerator and denominator.

$$= \frac{13p}{3}$$

Sum in reduced form.

Example 2: $\frac{8x+3}{2}+\frac{2x-7}{2}$

Solution

Step 1. Write the given as one expression.

$$\frac{8x+3}{2}+\frac{2x-7}{2} = \frac{(8x+3)+(2x-7)}{?}$$

Collect the numerators.

$$= \frac{(8x+3)+(2x-7)}{2}$$

Copy the common denominator.

Step 2. Combine like terms in the numerator by addition.

$(8x+3)+(2x-7)$	$\Rightarrow$	$8x$ & $2x$	Look for terms that have the same variables of the same exponent.
	$\Rightarrow$	3 & -7	Constants are always alike
$8x+\ 2x$	$=$	$\mathbf{10x}$	Add numerical coefficients and copy common variable.
$3+\ -7$	?	$7-3$	Subtract 3 from 7 because of unlike signs.
	$=$	$\mathbf{-4}$	Copy the sign of the greater number in the sum.
$\dfrac{(8x+3)+(2x-7)}{2}$	$=$	$\dfrac{10x-4}{2}$	Sum not yet reduced.

Step 3. Express the sum in reduced form.

$\dfrac{8x+3}{2}+\dfrac{2x-7}{2}$	$=$	$\dfrac{10x-4}{2}$	Look for GCF of the numerator and denominator.
	$=$	$\dfrac{2(5x-2)}{2}$	Factoring the GCMF (numerator)
	$=$	$\dfrac{\cancel{2}(5x-2)}{\cancel{2}}$	Divide out GCF.
	$=$	$5x-2$	Sum in reduced form.

Example 3: $\dfrac{x^2+4}{2x+4}+\dfrac{5x+2}{2x+4}$

Solution

Step 1. Write the given as one expression.

$\dfrac{x^2+4}{2x+4}+\dfrac{5x+2}{2x+4}$	$=$	$\dfrac{(x^2+4)+(5x+2)}{?}$	Collect the numerators.
	$=$	$\dfrac{(x^2+4)+(5x+2)}{2x+4}$	Copy the common denominator.

Step 2. Combine like terms in the numerator by addition.

$(x^2+4)+(5x+2)$	$\Rightarrow$	4 & 2	Constants are always alike.
$4+\ 2$	$=$	$\mathbf{6}$	Addition

$\frac{(x^2+4)+(5x+2)}{2x+4}$	$=$	$\frac{x^2+5x+6}{2x+4}$	Sum not yet reduced.

Step 3. Express the sum in reduced form.

$\frac{x^2+4}{2x+4}+\frac{5x+2}{2x+4}$	$=$	$\frac{x^2+5x+6}{2x+4}$	Look for GCF of the numerator and denominator.
	$=$	$\frac{(x+2)(x+3)}{2(x+2)}$	Factoring Trinomial (numerator) and Factoring GCMF (denominator)
	$=$	$\frac{\cancel{(x+2)}(x+3)}{2\cancel{(x+2)}}$	Divide out GCF.
	$=$	$\frac{x+3}{2}$	Sum in reduced form.

Example 4: $\frac{x^2-2}{x-1}-\frac{x}{1-x}$

Solution

Step 1. Rewrite $1-x$ in terms of $x-1$.

$1-x$	$=$	$-x+1$	Commutative Property of Addition
	$=$	$-1(x-1)$	Factor out -1.

Step 2. Use $-1(x-1)$ to rewrite $\frac{x}{1-x}$.

$\frac{x}{1-x}$	$=$	$\frac{x}{-1(x-1)}$	Factor out -1 to the denominator.
	$=$	$\frac{-x}{(x-1)}$	Simplifying $\frac{x}{-1}=-x$.

Step 3. Write the given as one expression.

$\frac{x^2-2}{x-1}-\frac{-x}{x-1}$	$=$	$\frac{x^2-2-(-x)}{?}$	Collect the numerators.
	$=$	$\frac{x^2-2-(-x)}{x-1}$	Copy the common denominator.

Step 4. Combine like terms in the numerator by subtraction.

$x^2-2-(-x)$	$=$	$x^2-2-(-x)$	There are no like terms.
	$=$	x^2-2+x	Multiply the two successive signs

(negative times negative equals positive.

$$= \boldsymbol{x^2 + x - 2}$$ Rearrange terms.

$$\frac{x^2 - 2 - (-x)}{x - 1} = \frac{x^2 + x - 2}{x - 1}$$ Difference not yet reduced.

Step 5. Express the difference in reduced form.

$$\frac{x^2 - 2}{x - 1} - \frac{-x}{x - 1} = \frac{x^2 + x - 2}{x - 1}$$ Look for GCF of the numerator and denominator.

$$= \frac{(x + 2)(x - 1)}{(x - 1)}$$ Factoring Trinomial (numerator)

$$= \frac{(x + 2)\cancel{(x - 1)}}{\cancel{(x - 1)}}$$ Divide out GCF.

$$= x + 2$$ Difference in reduced form.

Example 5: $\frac{2x-3}{3x^2+x-2} - \frac{-x-1}{3x^2+x-2}$

Solution

Step 1. Write the given as one expression.

$$\frac{2x - 3}{3x^2 + x - 2} - \frac{-x - 1}{3x^2 + x - 2} = \frac{(2x - 3) - (-x - 1)}{?}$$ Collect the numerators.

$$= \frac{(2x - 3) - (-x - 1)}{3x^2 + x - 2}$$ Copy the common denominator.

Step 2. Combine like terms in the numerator by subtraction.

$$(2x - 3) - (-x - 1))$$ ➡ $2x \;\&\; -x$

➡ $-3 \;\&\; -1$

Look for terms that have the same variables of the same exponent. Constants are always alike.

$$2x - (-x) \quad ? \quad 2x - (-x)$$ Multiply the two successive signs.

$$= 2x + x$$ Negative times negative equals positive.

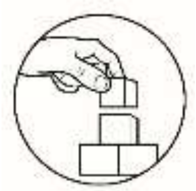
$$2x - (-x) = \boldsymbol{3x}$$ Add numerical coefficients and copy common variable.

$$-3 - (-1) \quad ? \quad -3 - (-1)$$ Multiply two successive signs.

	$?$	$-3+1$	Negative times negative equals positive.
	$?$	$3-1$	Subtract 1 from 3 because of unlike signs .
$-3-(-1)$	$=$	$\mathbf{-2}$	Copy the sign of the greater number in the difference.
$\dfrac{(2x-3)-(-x-1)}{3x^2+x-2}$	$=$	$\dfrac{3x-2}{3x^2+x-2}$	Difference not yet reduced.

Step 3. Express the difference in reduced form.

$\dfrac{2x-3}{3x^2+x-2}-\dfrac{-x-1}{3x^2+x-2}$	$=$	$\dfrac{3x-2}{3x^2+x-2}$	Look for GCF of the numerator and denominator.
	$=$	$\dfrac{(3x-2)}{(3x-2)(x+1)}$	Factoring Trinomial (denominator)
	$=$	$\dfrac{(\cancel{3x-2})}{(\cancel{3x-2})(x+1)}$	Divide out GCF.
	$=$	$\dfrac{1}{x+1}$	Difference in reduced form.



What's More

Directions: Perform the indicated operation and answer the questions that follow.

A. $\frac{3y}{4}+\frac{5y}{4}$

Questions:

1. What did you do to the numerators? What did you do too to the denominators?
2. How did you simplify your sum?

B. $\frac{5x-3}{6}+\frac{x-9}{6}$

Questions:

1. What did you do to the numerators? What did you do too to the denominators?
2. Did you find like terms among the collected terms of the numerator? What did you do to terms?
3. What factoring technique did you apply?
4. How did you simplify your sum?

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

Questions:

1. What did you do to the numerators? What did you do too to the denominators?
2. Did you find like terms among the collected terms of the numerator? What did you do to terms?
3. What factoring techniques did you apply?
4. How did you simplify your sum?

D. $\frac{3x^2-2}{3x-2} - \frac{x}{2-3x}$

Questions:

1. How did you make the denominators alike?
2. Did you find any successive signs in the numerator? What did you do to these signs?
3. What factoring technique did you apply?
4. How did you simplify your difference?

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

Questions:

1. Did you find like terms among the collected terms in the numerator? What did you do to the terms?
2. Did you find successive signs in the numerator? What did you do to these signs?
3. What factoring technique did you apply?
4. How did you simplify your difference?

What I Have Learned

Situation: Your classmate failed to attend the class when the topic on adding and subtracting similar rational algebraic expressions was discussed and you decided to help. Complete your explanation of the problem below to make your classmate understand. You may choose and use repeatedly phrases, words, terms, factors, or expressions from the table.

$$\frac{2p+6}{3}+\frac{p-1}{3}-\frac{2}{3}$$

copy common denominator	addition	write the given as one expression	subtraction	combine like terms in the numerator
reduced form	3	6	-1	2
$3p$	the same variable of like exponents	$p+1$	similar rational algebraic expressions	

I know that the given are ________________________. To add or subtract the rational algebraic expressions, first______________________. After that, ___________________. The next thing to do is to ______________________________. Like terms are those that have _________________________. From the given, the like terms in the numerator are: $2p$ & $p$and _______, ______ & ______. Then, these terms need to be combined by _______________ and _______________ because there are two operations in the given. As a result, ________ and _______ are the terms of the numerator. Because the final answer has to be in ______________, we need to factor the Greatest Common Monomial Factor (GCMF) in the numerator. Then, ________ has to be divided out. Finally, our answer is _________.

What I Can Do

Situation: Harvesting time of your father's sweet potatoes came. The whole family, including you, became very busy in the farm for one whole day. By the next day, the yield was delivered to the market and the whole family was happy because all of the potatoes were sold. When all have rested, your father asked you to compute for the profit. Your father showed you the following list.

Yield: $\dfrac{100p+200}{p}$

Expenses:

Labor $\dfrac{10p+50}{p}$ Fertilizers $\dfrac{10p-20}{p}$

Question: How will you solve for the profit of your father? Show your solution.

Lesson 2	Adding and Subtracting Dissimilar Rational Algebraic Expressions

Certainly, the previous lesson made you understand that adding and subtracting similar rational algebraic expressions are the same as adding and subtracting similar fractions. Like fractions also, there are dissimilar rational algebraic expressions or those that have different denominators. Do you think adding and subtracting dissimilar rational algebraic expressions are like adding and subtracting dissimilar fractions? You will find out as this lesson unfolds.

What's In

A. Directions: Find the LCM of the following real numbers.

1. $32 \ \& \ 14$ 2. $15 \ \& \ 12$

B. Find the LCD of the following fractions.

1. $\frac{3}{32} \ \& \ \frac{7}{14}$ 2. $\frac{6}{15} \ \& \ \frac{3}{12}$

C. Supply the missing number to make the two sides of the equation equal.

1. $\frac{3}{5} = \frac{?}{30}$ 2. $\frac{6}{7} = \frac{?}{21}$

D. Perform the indicated operation. The first one is done as illustration.

1. $\frac{3}{5} + \frac{7}{6} = \frac{(3)(6)}{(5)(6)} + \frac{(7)(5)}{(5)(6)} = \frac{18}{30} + \frac{35}{30} = \frac{43}{30}$
2. $\frac{5}{6} + \frac{4}{8}$
3. $\frac{8}{9} - \frac{2}{3}$

Questions:

1. How did you find the LCM in the given of Activity A?
2. How did you find the LCD in Activity B?
3. Do you see the relationship of LCM and LCD?
4. How did you find the missing number in Activity C?
5. Identify from among the following steps the ones that you used to answer the activity. Write Yes for the steps that you used and No for those that you did not use.

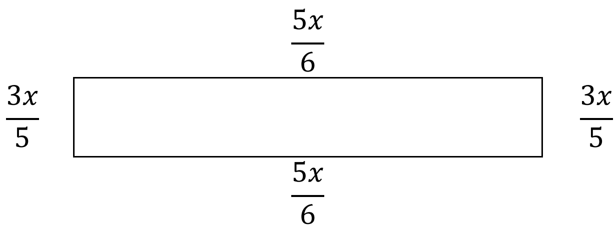
______a. Find the LCD.
______b. Find the equivalent fractions of the given.
______c. Perform the indicated operation using the equivalent fractions with the LCD as denominators.
______d. If the resulting numerator and denominator in the sum or difference have common factors, reduce by dividing out the common factors.

What's New

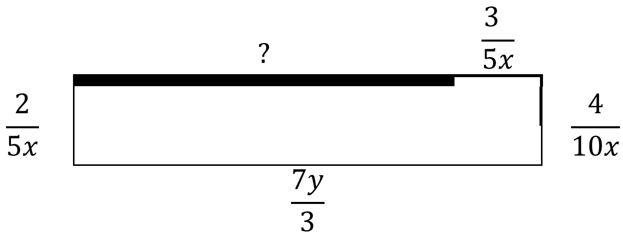
Situation: The next planting season of sweet potatoes has come. Your father decided to extend the area to be planted by creating additional plots and you are requested again by your father to measure the distance around the plots as shown below.

Consider the situation above and supply what is asked in the illustration. Remember that $Side\ 1 + Side\ 2 + Side\ 3 + \cdots = Distance\ aroun\ the\ plot.$

1. Find the distance around the rectangular plot as illustrated.



2. Find how long the other side of the plot that is illustrated below.



Questions:

1. What should you call rational algebraic expressions that have the dissimilar denominators?

2. How did you answer Item 1?

3. How did you answer item 2?

4. Identify from among the following steps the ones that you used to answer Activity D. Write Yes for the steps that you used and No for those that you did not use.

   ______a. Find the LCD.

   ______b. Find the equivalent expression of the given.

   ______c. Perform the indicated operation using the equivalent expressions with the LCD as denominators.

   ______d. If the resulting numerator and denominator in the sum or difference have common factors, reduce by dividing out the common factors.

5. Do you find similarities between the rules of adding & subtracting dissimilar fractions and adding & subtracting dissimilar rational algebraic expressions?

What is It

The distance around the plots in the previous activity was solved by adding and subtracting dissimilar rational algebraic expressions in the same manner as dissimilar fractions. See below more examples of adding and subtracting dissimilar rational algebraic expressions.

A. Finding Least Common Multiple (LCM) of Monomials and Polynomials

Example 1. Find the LCM of $15x^2y, 12xy, \& \ 3y^2$.
Solution:

Step 1. Factorize the given monomials and arrange like factors in one column.

$15x^2y$	$=$	$5\cdot$	$3\cdot$			$x\cdot$	$x\cdot$	$y\cdot$		Prime factorization
$12xy$	$=$		$3\cdot$	$2\cdot$	$2\cdot$	$x\cdot$		$y\cdot$		
$3y^2$	$=$		$3\cdot$					$y\cdot$	y	

Step 2. Bring down each kind of factor in each column.

$15x^2y$	$=$	$5\cdot$	$3\cdot$			$x\cdot$	$x\cdot$	$y\cdot$		
$12xy$	$=$		$3\cdot$	$2\cdot$	$2\cdot$	$x\cdot$		$y\cdot$		
$3y^2$	$=$		$3\cdot$					$y\cdot$	y	
		$5\cdot$	$3\cdot$	$2\cdot$	$2\cdot$	$x\cdot$	$x\cdot$	$y\cdot$	y	Factors that are brought down.

Step 3. Multiply all the factors that are brought down. Their product is the LCM.

$15x^2y$	$=$	$5\cdot$	$3\cdot$			$x\cdot$	$x\cdot$	$y\cdot$		
$12xy$	$=$		$3\cdot$	$2\cdot$	$2\cdot$	$x\cdot$		$y\cdot$		
$3y^2$	$=$		$3\cdot$					$y\cdot$	y	
		$5\cdot$	$3\cdot$	$2\cdot$	$2\cdot$	$x\cdot$	$x\cdot$	$y\cdot$	y	Multiply all the factors in this row.

$$LCM = 60x^2y^2$$

Example 2: Find the LCM of $x^2 + 2x + 1$ and $2x + 2$.
Solution.
Step 1. Factorize the given monomials and arrange like factors in one column.

$x^2 + 2x + 1$	$=$		$(x + 1)$	$(x + 1)$	Factoring Trinomial
$2x + 2$	$=$	(2)	$(x + 1)$		Factoring GCMF

Step 2. Bring down each kind of factor in each column.

$x^2 + 2x + 1$	$=$		$(x+1)$	$(x+1)$	
$2x + 2$	$=$	(2)	$(x + 1)$		
		(2)	$(x + 1)$	$(x + 1)$	Factors that are brought down.

Step 3. Multiply all the factors that are brought down. Their product is the LCM.

$x^2 + 2x + 1$	$=$		$(x+1)$	$(x+1)$	
$2x + 2$	$=$	(2)	$(x + 1)$		
		(2)	$(x + 1)$	$(x + 1)$	Multiply all the factors in this row

$LCM \quad = \quad (2)(x + 1)(x + 1)$ Factored form of the LCM

$= \quad 2x^2 + 4x + 2$ Expanded form of LCM

B. Adding and Subtracting Dissimilar Rational Algebraic Expressions

As you go along in this section you have to bear in mind that the Least Common Multiple (LCM) of the denominators of dissimilar rational algebraic expressions is the Least Common Denominator (LCD) of the expressions.

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

Solution

Step 1. Find the LCD of the expressions.

x	$=$	x		Prime factorization
y	$=$		y	
		x	y	Bring down each kind of factor in each column.

$LCM = LCD \quad = \quad xy$ Multiply all the factors that are brought down.

Step 2. Find the equivalent expression of each of the given using the LCD as denominator.

$$\frac{x+y}{x} = \frac{?}{xy}$$ Equivalent of expression 1 with missing numerator

2a. Divide the LCD by the original denominator.

$$\frac{xy}{x} = \frac{\cancel{x}y}{\cancel{x}}$$ Divide out common factor.

$$= y$$ Simplified.

2b. Multiply the result in 2a with the original numerator.

$$y(x+y) = xy + y^2$$ Distributive Property

2c. The answer in 2b is the missing numerator of the equivalent expression.

$$\frac{x+y}{x} = \frac{?}{xy}$$ Equivalent of expression 1 with missing numerator

$$= \frac{\boldsymbol{xy+y^2}}{\boldsymbol{xy}}$$ Equivalent expression of expression 1

$$\frac{x+y}{y} = \frac{?}{xy}$$ Equivalent of expression 2 with missing numerator

2a. Divide the LCD by the original denominator.

$$\frac{xy}{y} = \frac{x\cancel{y}}{\cancel{y}}$$ Divide out common factor.

$$= x$$ Simplified.

2b. Multiply the result in 2a with the original numerator.

$$x(x+y) = x^2 + xy$$ Distributive Property

2c. The answer in 2b is the missing numerator of the equivalent expression.

$$\frac{x+y}{y} = \frac{?}{xy}$$ Equivalent of expression 2 with missing numerator

$$= \frac{\boldsymbol{x^2+xy}}{\boldsymbol{xy}}$$ Equivalent expression of expression 2

Step 3. Proceed to perform the operation using the equivalent fractions and using the steps of similar algebraic expressions.

$$\frac{x+y}{x} + \frac{x+y}{y} = \frac{\boldsymbol{xy+y^2}}{\boldsymbol{xy}} + \frac{\boldsymbol{x^2+xy}}{\boldsymbol{xy}}$$ Given transformed into similar rational algebraic expressions.

	$=$	$\dfrac{xy + y^2 + x^2 + xy}{xy}$	Write as one expression.
	$=$	$\dfrac{xy + y^2 + x^2 + xy}{xy}$	Determine like terms in the numerator.
$xy + xy$	$=$	$2xy$	Like terms combined by addition.
$\dfrac{x+y}{x} + \dfrac{x+y}{y}$	$=$	$\dfrac{x^2 + 2xy + y^2}{xy}$	Simplified numerator.
	$=$	$\dfrac{(x+y)(x+y)}{xy}$	Factoring Trinomial (numerator)
	$=$	$\boldsymbol{\dfrac{x^2 + 2xy + y^2}{xy}}$	Sum in expanded form

Example 2. $\dfrac{3x+1}{x^2+2x+1} + \dfrac{5}{2x+2}$

Solution

Step 1. Find the LCD of the expressions.

$x^2 + 2x + 1$	$=$		$(x+1)$	$(x+1)$	Factoring Trinomial
$2x + 2$	$=$	(2)	$(x+1)$		Factoring GCMF
		(2)	$(x+1)$	$(x+1)$	Bring down each kind of factor in each column.
$LCM = LCD$	$=$	$(2)(x+1)(x+1)$			Multiply all the factors that are brought down.

Step 2. Find the equivalent expression of each of the given both using the LCD as denominator.

$\dfrac{3x+1}{x^2+2x+1}$	$=$	$\dfrac{3x+1}{(x+1)(x+1)}$	Factoring Trinomial (denominator)
$\dfrac{3x+1}{(x+1)(x+1)}$	$=$	$\dfrac{?}{(2)(x+1)(x+1)}$	Equivalent expression with missing numerator

2a. Divide the LCD by the original denominator.

$\dfrac{(2)(x+1)(x+1)}{(x+1)(x+1)}$	$=$	$\dfrac{(2)\cancel{(x+1)}\cancel{(x+1)}}{\cancel{(x+1)}\cancel{(x+1)}}$	Divide out common factor.
	$=$	2	Simplified.

2b. Multiply the result in 2a with the original numerator.

$2(3x+1)$	$=$	$6x + 2$	Distributive Property

2c. The answer in 2b is the missing numerator of the equivalent expression.

$\frac{3x+1}{(x+1)(x+1)}$	$=$	$\frac{?}{(2)(x+1)(x+1)}$	Equivalent expression with missing numerator
	$=$	$\frac{\mathbf{6x+2}}{\mathbf{(2)(x+1)(x+1)}}$	Equivalent expression of expression 1

$\frac{5}{2x+2}$	$=$	$\frac{5}{2(x+1)}$	Factoring GCMF (denominator)
$\frac{5}{2(x+1)}$	$=$	$\frac{?}{(2)(x+1)(x+1)}$	Equivalent expression with missing numerator

2a. Divide the LCD by the original denominator.

$\frac{(2)(x+1)(x+1)}{(2)(x+1)}$	$=$	$\frac{\cancel{(2)}\cancel{(x+1)}(x+1)}{\cancel{(2)}\cancel{(x+1)}}$	Divide out common factor.
	$=$	$x+1$	Simplified.

2b. Multiply the result in 2a with the original numerator.

$5(x+1)$	$=$	$5x+5$	Distributive Property

2c. The answer in 2b is the missing numerator of the equivalent expression.

$\frac{5}{2(x+1)}$	$=$	$\frac{?}{(2)(x+1)(x+1)}$	Equivalent expression with missing numerator
	$=$	$\frac{\mathbf{5x+5}}{\mathbf{(2)(x+1)(x+1)}}$	Equivalent expression of expression 2

Step 3. Proceed to perform the operation using the equivalent fractions and using the steps of similar algebraic expressions.

$\frac{3x+1}{x^2+2x+1}+\frac{5}{2x+2}$	$=$	$\frac{\mathbf{6x+2}}{\mathbf{(2)(x+1)(x+1)}}+\frac{\mathbf{5x+5}}{\mathbf{(2)(x+1)(x+1)}}$	Given transformed into similar rational algebraic expressions.
	$=$	$\frac{6x+2+5x+5}{(2)(x+1)(x+1)}$	Write as one expression
	$=$	$\frac{6x+2+5x+5}{(2)(x+1)(x+1)}$	Determine like terms of the numerator.
$6x+5x$	$=$	$11x$	Like terms combined by addition.
$2+5$	$=$	7	

$\dfrac{3x+1}{x^2+2x+1}+\dfrac{5}{2x+2}$	$=$	$\dfrac{11x+7}{(2)(x+1)(x+1)}$	Simplified numerator.
	$=$	$\dfrac{\mathbf{11x+7}}{\mathbf{2x^2+4x+2}}$	Sum in expanded form

Example 3. $\frac{x+1}{x+2} - \frac{x+1}{x+3}$

Solution

Step 1. Find the LCD of the expressions.

$x+2$	$=$	$(x+2)$		Prime factorization
$x+3$	$=$		$(x+3)$	
		$(x+2)$	$(x+3)$	Bring down each kind of factor in each column.
$LCM = LCD$	$=$	$(x+2)(x+3)$		Multiply all the factors that are brought down.

Step 2. Find the equivalent expression of each of the given both using the LCD as denominator.

$\dfrac{x+1}{x+2}$	$=$	$\dfrac{?}{(x+2)(x+3)}$	Equivalent of expression 1 with missing numerator

2a. Divide the LCD by the original denominator.

$\dfrac{(x+2)(x+3)}{(x+2)}$	$=$	$\dfrac{\cancel{(x+2)}(x+3)}{\cancel{(x+2)}}$	Divide out common factor.
	$=$	$x+3$	Simplified.

2b. Multiply the result in 2a with the original numerator.

$(x+3)(x+1)$	$?$	x^2	Multiply **F**irst Terms.
$(x+3)(x+1)$	$?$	x^2+x	Multiply **O**uter Terms.
$(x+3)(x+1)$	$?$	x^2+x+3x	Multiply **I**nner Terms.
$(x+3)(x+1)$	$=$	$x^2+x+3x+3$	Multiply **L**ast Terms.
$(x+3)(x+1)$	$=$	$x^2+x+3x+3$	Determine like terms.
	$=$	x^2+4x+3	Combine like terms.

2c. The answer in 2b is the missing numerator of the equivalent expression.

$\dfrac{x+1}{x+2}$	$=$	$\dfrac{?}{(x+2)(x+3)}$	Equivalent of expression 1 with missing numerator
	$=$	$\dfrac{\boldsymbol{x^2+4x+3}}{\boldsymbol{(x+2)(x+3)}}$	Equivalent expression of expression 1

$\dfrac{x+1}{x+3}$	$=$	$\dfrac{?}{(x+2)(x+3)}$	Equivalent of expression 2 with missing numerator

2a. Divide the LCD by the original denominator.

$\dfrac{(x+2)(x+3)}{(x+3)}$	$=$	$\dfrac{(x+2)\cancel{(x+3)}}{\cancel{(x+3)}}$	Divide out common factor.
	$=$	$x+2$	Simplified.

2b. Multiply the result in 2a with the original numerator.

$(x+2)(x+1)$	?	x^2	Multiply **F**irst Terms.
$(x+2)(x+1)$	?	x^2+x	Multiply **O**uter Terms.
$(x+2)(x+1)$	?	x^2+x+2x	Multiply **I**nner Terms.
$(x+2)(x+1)$	$=$	$x^2+x+2x+2$	Multiply **L**ast Terms.
$(x+2)(x+1)$	$=$	$x^2+x+2x+2$	Determine like terms.
	$=$	x^2+3x+2	Combine like terms.

2c. The answer in 2b is the missing numerator of the equivalent expression.

$\dfrac{x+1}{x+3}$	$=$	$\dfrac{?}{(x+2)(x+3)}$	Equivalent of expression 2 with missing numerator
	$=$	$\dfrac{\boldsymbol{x^2+3x+2}}{\boldsymbol{(x+2)(x+3)}}$	Equivalent expression of expression 2

Step 3. Proceed to perform the operation using the equivalent fractions and using the steps of similar algebraic expressions.

$\dfrac{x+1}{x+2}-\dfrac{x+1}{x+3}$	$=$	$\dfrac{\boldsymbol{x^2+4x+3}}{\boldsymbol{(x+2)(x+3)}}-\dfrac{\boldsymbol{x^2+3x+2}}{\boldsymbol{(x+2)(x+3)}}$	Given transformed into similar rational algebraic expressions.
	$=$	$\dfrac{x^2+4x+3-(x^2+3x+2)}{(x+2)(x+3)}$	Write as one expression.
	$=$	$\dfrac{x^2+4x+3-(x^2+3x+2)}{(x+2)(x+3)}$	Determine like terms in the numerator.

$x^2 - x^2 = 0$		Like terms combined by subtraction.
$4x - 3x = x$		
$3 - 2 = 1$		
$\frac{x+1}{x+2} - \frac{x+1}{x+3} = \frac{x+1}{(x+2)(x+3)}$		Simplified numerator.
$= \frac{\boldsymbol{x+1}}{\boldsymbol{x^2+5x+6}}$		Difference in expanded form

Example 4. $\frac{2}{x^2-2x-3} - \frac{2}{x^2-x-2}$

Solution

Step 1. Find the LCD of the expressions.

$x^2 - 2x - 3 =$	$(x+1)$		$(x-3)$	Factoring Trinomial
$x^2 - x - 2 =$	$(x+1)$	$(x-2)$		Factoring Trinomial
	$(x+1)$	$(x-2)$	$(x-3)$	Bring down each kind of factor in each column.

$$LCM = LCD = (x+1)(x-2)(x-3)$$ Multiply all the factors that are brought down.

Step 2. Find the equivalent expression of each of the given both using the LCD as denominator.

$$\frac{2}{x^2-2x-3} = \frac{2}{(x+1)(x-3)}$$ Factoring Trinomial (denominator)

$$\frac{2}{(x+1)(x-3)} = \frac{?}{(x+1)(x-2)(x-3)}$$ Equivalent of expression 1 with missing numerator

2a. Divide the LCD by the original denominator.

$$\frac{(x+1)(x-2)(x-3)}{(x+1)(x-3)} = \frac{\cancel{(x+1)}(x-2)\cancel{(x-3)}}{\cancel{(x+1)}\cancel{(x-3)}}$$ Divide out common factor.

$$= x - 2$$ Simplified.

2b. Multiply the result in 2a with the original numerator.

$$(x-2)(2) = (x)(2) - (2)(2)$$ Distributive Property

$$= 2x - 4$$ Simplified.

2c. The answer in 2b is the missing numerator of the equivalent expression.

$$\frac{2}{(x+1)(x-3)} = \frac{?}{(x+1)(x-2)(x-3)}$$ Equivalent of expression 1 with missing numerator

	$=$	$\dfrac{\mathbf{2x-4}}{\mathbf{(x+1)(x-2)(x-3)}}$	Equivalent expression of expression

---

$\dfrac{2}{x^2-x-2}$	$=$	$\dfrac{2}{(x+1)(x-2)}$	Factoring Trinomial (denominator)
$\dfrac{2}{(x+1)(x-2)}$	$=$	$\dfrac{?}{(x+1)(x-2)(x-3)}$	Equivalent of expression 2 with missing numerator

2a. Divide the LCD by the original denominator.

$\dfrac{(x+1)(x-2)(x-3)}{(x+1)(x-2)}$	$=$	$\dfrac{\cancel{(x+1)}\cancel{(x-2)}(x-3)}{\cancel{(x+1)}\cancel{(x-2)}}$	Divide out common factor.
	$=$	$x-3$	Simplified.

2b. Multiply the result in 2a with the original numerator.

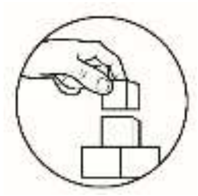
$(x-3)(2)$	$=$	$(x)(2)-(3)(2)$	Distributive Property
	$=$	$2x-6$	Simplified.

2c. The answer in 2b is the missing numerator of the equivalent expression.

$\dfrac{2}{(x+1)(x-2)}$	$=$	$\dfrac{?}{(x+1)(x-2)(x-3)}$	Equivalent of expression 2 with missing numerator
	$=$	$\dfrac{\mathbf{2x-6}}{\mathbf{(x+1)(x-2)(x-3)}}$	Equivalent expression of expression 2

Step 3. Proceed to perform the operation using the equivalent fractions and using the steps of similar algebraic expressions.

$\dfrac{2}{x^2-2x-3}-\dfrac{2}{x^2-x-2}$	$=$	$\dfrac{\mathbf{2x-4}}{\mathbf{(x+1)(x-2)(x-3)}}-\dfrac{\mathbf{2x-6}}{\mathbf{(x+1)(x-2)(x-3)}}$	Given transformed into similar rational algebraic expressions.
	$=$	$\dfrac{2x-4-(2x-6)}{(x+1)(x-2)(x-3)}$	Write as one expression.
	$=$	$\dfrac{2x-4-(2x-6)}{(x+1)(x-2)(x-3)}$	Determine like terms in the numerator.
$2x-\ 2x$	$=$	0	Like terms combined by subtraction.
$-4-(-6)$	$=$	$-4+6$	
	$=$	2	
$\dfrac{2}{x^2-2x-3}-\dfrac{2}{x^2-x-2}$	$=$	$\dfrac{2}{(x+1)(x-2)(x-3)}$	Simplified numerator.
	$=$	$\dfrac{\mathbf{2}}{\mathbf{x^3-4x^2+x+6}}$	Difference in expanded form



What's More

A. Find the LCM of the following expressions.

1. $12x^2y^3$ *and* $15x^3y$
2. $x^2 - 7x + 6$ *and* $x^2 - 1$

Questions:

1. How did you get the LCM of the given?
2. What factoring techniques did you apply in Item 2?

B. Perform the indicated operation and answer the questions that follow.

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

Questions:

1. How did you find the LCD of the unlike expressions above?
2. How did you transform the given into similar rational algebraic expressions?
3. When expressions in Item 3 became similar, how many like terms in the numerator did you find?
4. In Items 3 and 4, what did you do to the signs of the terms that follow the subtraction operation?
5. What factoring techniques did you use to factorize the denominators of Items 2 and 4?

What I Have Learned

Situation: Your classmate is finalizing the solution-explanation card project but is unsure of the solution and explanation. Please do help complete the project!

$$\frac{5x+1}{2}+\frac{x-3}{3}-\frac{x}{4}$$

Solution	Explanation
	I know how to _____________.
$LCM = LCD = (\_\_\_\_)(\_\_\_)$	First, ______________________.
$\frac{5x+1}{2} = \frac{?}{(\_\_\_)(4)}$	After that, __________________.
$\frac{x-3}{3} = \frac{?}{(3)(\_\_)}$	
$\frac{x}{4} = \frac{?}{(3)(4)}$	
$\frac{5x+1}{2}+\frac{x-3}{3}-\frac{x}{4} = \frac{30x+6+4x-12-(\_\_)}{12}$	Then, _____________________.
$= \frac{31x - \_\_\_\_\_\_\_}{12}$	Finally, ___________________.

What I Can Do

Situation: Next harvesting time of your father's sweet potatoes came. Again, all of you became very busy in the farm for a day. The harvest by the grace of God was plenty. The yield was delivered to the market and all of the potatoes were sold. After having rested, your father showed you the list below and asked you to compute for the profit of the season.

Yield: $\frac{100p+200}{2p}$

Expenses:

Labor $\frac{10p+20}{3p}$ Fertilizers $\frac{5p-10}{p}$

Questions:

1. How will you solve for the profit of your father? Show your solution.

Assessment

Direction: Choose the correct answer. Write your answers on a separate sheet of paper.

1. Give the least common denominator $\frac{4}{2ab^2}$ and $\frac{5}{4ab}$

   A. ab^2 C. $4ab^2$
   B. $2ab^2$ D. $6ab^2$

2. Look for the sum of $\frac{2a}{bc} + \frac{a}{bc}$.

   A. $\frac{2a^2}{bc}$ C. $\frac{3a}{bc}$
   B. $\frac{3a^2}{bc}$ D. $\frac{4a}{bc}$

3. Find simplified form of $\frac{2x}{3} + \frac{x}{4}$.

   A. $\frac{8x}{12}$ C. $\frac{10x}{12}$
   B. $\frac{9x}{12}$ D. $\frac{11x}{12}$

4. Perform the indicated operation. $\frac{x-2}{2} - \frac{x+2}{5}$

   A. $\frac{3x}{10}$ C. $\frac{3x-14}{10}$
   B. $\frac{-14}{10}$ D. $\frac{3x+14}{10}$

5. Given $\frac{x+3}{3}$ as one addend of the sum $\frac{8x-2}{3}$, find the other addend.

   A. $\frac{6x-4}{3}$ C. $\frac{8x-6}{3}$
   B. $\frac{7x-5}{3}$ D. $\frac{9x-7}{3}$

6. Perform the indicated operation. $\frac{2x-5}{4} + \frac{x+3}{4}$

   A. $\frac{3x-2}{4}$ C. $\frac{3x-6}{4}$
   B. $\frac{3x-4}{4}$ D. $\frac{3x-8}{4}$

7. Find the least common denominator of $\frac{7}{9-3a}$ and $\frac{2}{3-a}$.

   A. 3 C. $3(3-a)$
   B. $3-a$ D. $4(4-a)$

8. Write as one fraction and simplify $\frac{2}{x^2+x} - \frac{3}{x+1}$.

   A. $\frac{2}{x+1}$ C. $\frac{2-3x}{x}$
   B. $\frac{-3}{x+1}$ D. $\frac{2-3x}{x(x+1)}$

9. Find among the choices below the sum of $\frac{3}{x} + \frac{5}{x-1}$.

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

10. Subtract $\frac{r+9}{r-2}$ from $\frac{2r+1}{r-2}$.

A. $\frac{r-7}{r-2}$

B. $\frac{r-8}{r-2}$

C. $\frac{r-9}{r-2}$

D. $\frac{r-10}{r-2}$

11. Using the LCD 9, look for the equivalent rational algebraic expression of $\frac{x+1}{3}$.

A.

B. $\frac{x+1}{9}$

C. $\frac{2x+2}{9}$

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

E. $\frac{4x+4}{9}$

12. Using the LCD ab, look for the equivalent rational algebraic expression of each of $\frac{b+1}{b}$ and $\frac{c+1}{c}$.

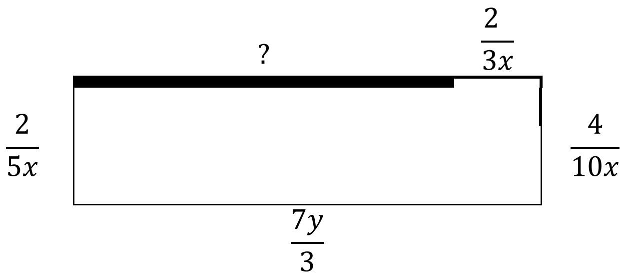
A. $\frac{b+1}{bc}, \frac{c+1}{bc}$

B. $\frac{bc+1}{bc}, \frac{c+1}{bc}$

C. $\frac{b+1}{bc}, \frac{bc+b}{bc}$

D. $\frac{bc+c}{bc}, \frac{bc+b}{bc}$

13. Find among the following the truth about similar rational algebraic expressions.
    A. The denominators are sometimes different but always with prime numerators.
    B. The numerators are sometimes the same but always with different denominators.
    C. The numerators are sometimes different but always with the same denominators.
    D. The numerators are sometimes the same but always with prime denominators.
14. Find among the following the truth about dissimilar rational algebraic expressions.
    A. The numerators are sometimes the same but always with different denominators.
    B. The numerators are sometimes different but always with the same denominators.
    C. The numerators are sometimes the same but always with prime denominators.
    D. The denominators are sometimes different but always with prime numerators.
15. The rectangular plot for the carrots has the dimensions shown below. Find the length of the side labeled with a question mark is.



A. $\frac{7y-2}{3x}$

B. $\frac{7xy-2}{3x}$

C. $\frac{7x-4}{3x}$

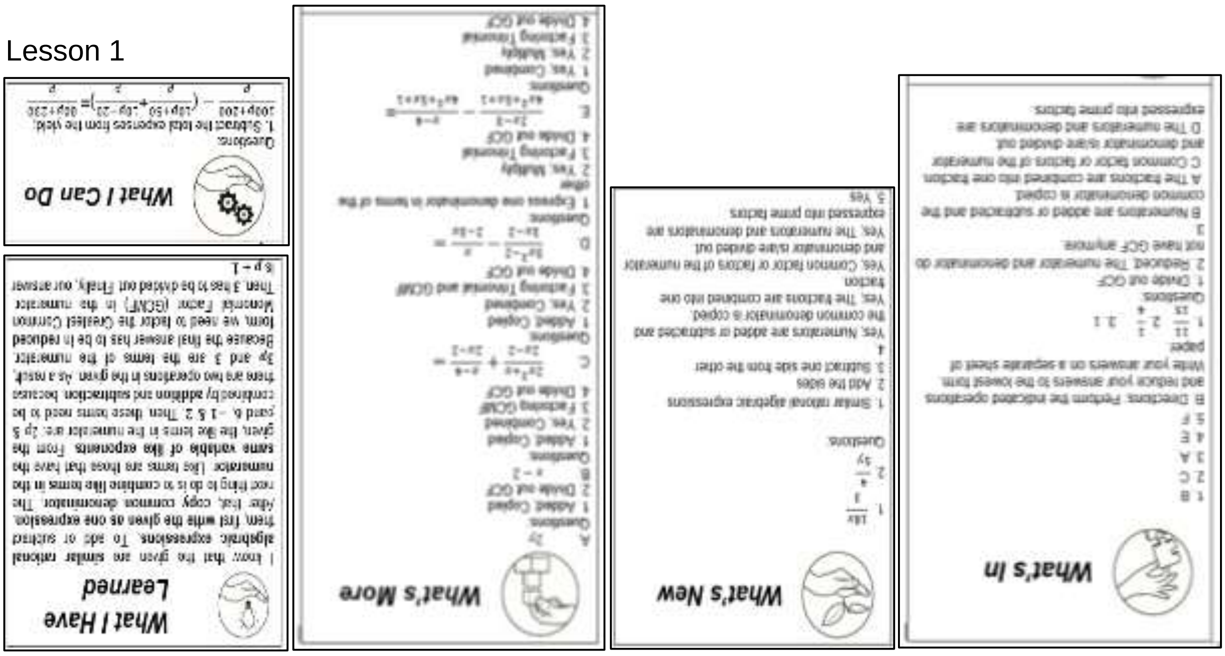
D. $\frac{7xy-4}{3x}$

Additional Activities

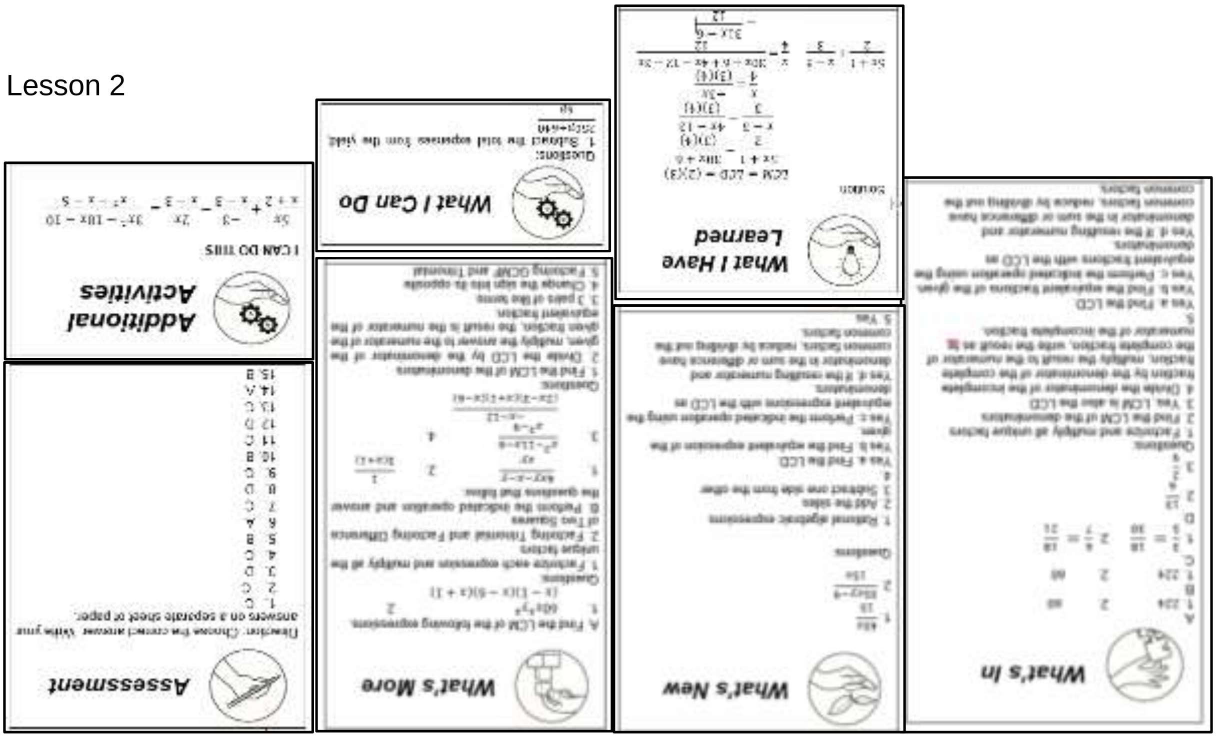
Directions: Perform the indicated operations in the expression $\frac{5x}{x+2} + \frac{-3}{x-3} - \frac{2x}{x-3}$.

Answer Key

Lesson 1



Lesson 2



References

Abuzo, E.P., Bryant, M.L., Cabrella, J.B., Caldez, B.P., Callanta, M.M., Castro, A.I., Halabaso, A.R., et. al (2013). Mathematics 8 - Learner's Module. Department of Education, Pasig City, Philippines, pp. 81-104

http://www.kutasoftware.com/FreeWorksheets/Alg2Worksheets/Adding+Subtracting%20Rational%20Expressions.pdf
Date Retrieved: December 3, 2019

https://cdn.kutasoftware.com/Worksheets/Alg1/Multiplying%20Rational%20Expressions.pdf
Date Retrieved: December 3, 2019

For inquiries or feedback, please write or call:

Department of Education - Bureau of Learning Resources (DepEd-BLR)

Ground Floor, Bonifacio Bldg., DepEd Complex
Meralco Avenue, Pasig City, Philippines 1600

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

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