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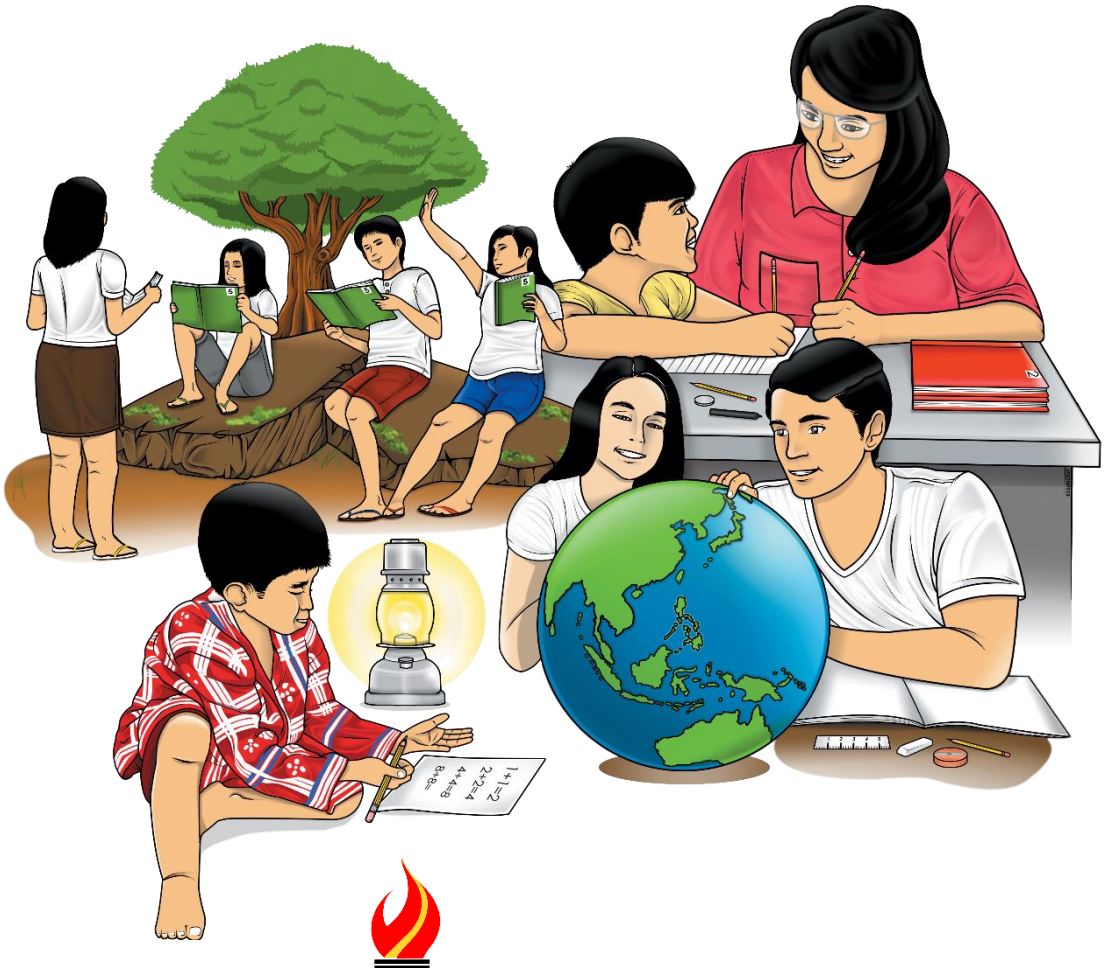
Mathematics

Quarter 1 – Module 14: Multiplying Fractions by its Reciprocal



ALTERNATIVE DELIVERY MODE
ADM

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 1 – Module 14: Multiplying Fractions by its Reciprocal
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Quarter 1 – Module 14: Multiplying Fractions by its Reciprocal

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Introductory Message

For the Facilitator:

Welcome to the Mathematics 5 Alternative Delivery Mode (ADM) Module 14 on Multiplying Fractions by its Reciprocal!

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 to 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 5 Alternative Delivery Mode (ADM) Module 14 on Multiplying Fractions by its Reciprocal!

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 is composed of a 10-item activity 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 fill in the blank sentence/paragraph to process what you learned from the lesson.
 ***What I Can Do***	This section provides an activity that will help you transfer your new knowledge or skill in real-life situations or concerns.
 ***Assessment***	This is another 10-item task that 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 you 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 instructions 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

Hi, mathletes!

In this module, you will learn to show that multiplying a fraction by its reciprocal is equal to 1. You will also learn the importance of reciprocal of a number, how it will give you an easier way to do the multiplication of fractions and also the division of fractions.

At the end of this module, you are expected to:

- find the reciprocal of a number; and
- determine the product of a fraction and its reciprocal.

What I Know

Answer the exercises below, this will help you recall your previous lessons. ENJOY!

Directions: Choose the letter of the correct answer. Write your answers in your activity notebook.

1) What is the reciprocal of $\frac{3}{8}$?

A. $\frac{6}{8}$ B. $\frac{8}{3}$ C. $\frac{3}{4}$ D. $\frac{12}{16}$

2) 2 is he reciprocal of _____.

A. $\frac{1}{3}$ B. $\frac{4}{2}$ C. $\frac{1}{2}$ D. $\frac{1}{4}$

3) What is the multiplicative inverse of $\frac{5}{6}$.

A. $\frac{11}{6}$ B. $\frac{5}{11}$ C. $1\frac{1}{6}$ D. $1\frac{1}{5}$

4) Gerard's favorite drink is hot choco milk. Each day he drunk of at least $\frac{3}{4}$ quart in a glass, each glass contains exactly $\frac{2}{5}$ quarts. If the reciprocal is $\frac{5}{2}$, how many glass of hot choco milk will Gerard be able to fill?

A. $\frac{2}{5}$ B. $\frac{5}{2}$ C. $1\frac{7}{8}$ D. $1\frac{8}{7}$

5) Chea's father always measures her height every month. Her father noticed that she grows of an average of $1\frac{\mathbf{1}}{\mathbf{2}}$ inches in a month. If Chea's desires is to at least grow $60\frac{3}{4}$ inches tall , give the reciprocal of Chea's desired height.

A. $\frac{123}{4}$ B. $\frac{4}{123}$ C. $\frac{2}{3}$ D. $\frac{3}{2}$

6) Refer to problem above, how long will it take Chea's to reach at least 5ft tall or $60\frac{3}{4}$ inches ?

A. 21 months B. $20\frac{1}{2}$ months C. $12\frac{1}{2}$ months D. $10\frac{1}{2}$months

7) What is the product of 8 and $\frac{1}{8}$?

A. $1\frac{1}{8}$ B. $\frac{8}{1}$ C. 1 D. 8

8) What is the product of $2\frac{2}{5}$ and $\frac{5}{12}$?

A. $2\frac{10}{60}$ B. $\frac{20}{60}$ C. 1 D. 0

9) If $\frac{4}{9}$ is multiplied to a number, the product is 1 what is the number?

A. $\frac{2}{3}$ B. 1 C. $\frac{9}{4}$ D. $2\frac{1}{9}$

10) If $\frac{4}{20}\ x\ n = 1$, what is the value of n?

A. $\frac{1}{5}$ B. 5 C. 20 D. 4

Lesson 1 Multiplying Fractions by its Reciprocal

What's In

Directions: Find the product of each of the following mentally. Choose the letter of the correct answer and write your answer in your activity notebook.

Here's an example:

$\frac{2}{6} \times \frac{3}{4} = ?$ * $\frac{2}{6} \times \frac{3}{4} = \frac{6}{24}$ or $\frac{1}{4}$

1) $\frac{3}{4} \times \frac{1}{2} =$ _____?

A. $\frac{3}{8}$ B. $\frac{1}{2}$ C. $\frac{4}{6}$ D. 1

2) $\frac{2}{5} \times \frac{5}{6} =$ _____?

A. $\frac{1}{3}$ B. $\frac{10}{11}$ C. $\frac{7}{11}$ D. 3

3) $\frac{5}{9} \times \frac{3}{5} =$ _____?

A. $\frac{1}{3}$ B. $\frac{2}{4}$ C. $\frac{3}{6}$ D. $\frac{1}{2}$

4) $\frac{3}{4} \times \frac{2}{3} =$ _____?

A. $\frac{4}{8}$ B. $\frac{3}{9}$ C. $\frac{1}{2}$ D. $\frac{5}{12}$

5) $\frac{4}{8} \times \frac{4}{5} =$ _____?

A. $\frac{6}{8}$ B. $\frac{2}{5}$ C. $\frac{2}{3}$ D. $\frac{8}{13}$

What's New

Situation :

In a math contest, the contestants were given three seconds to give the value of N in the number sentence $\frac{3}{8} x\ N = 1$. After 3 seconds, all the contestants were able to get the correct answer. Do you wonder how the contestants found the answer so fast?

Let us journey together how will it be easier to us to get the reciprocal of a given fraction.

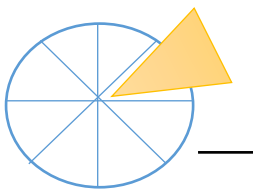
What Is It

Let us discover how to that find the reciprocal by its equivalent in getting the common denominator and dividing it to the numerators. Below will give you an idea how it is done, carefully read the given problems or situations.

Situation:

Every time my mother went to market, she always bought a pasalubong for us, most of the times a circular pan of buko pie. She will divide it into 8 equal slices. What do you call each slice?

Let us make a model to this.



$= \mathbf{\frac{1}{8}}$ one-eighth shaded part

$= \mathbf{\frac{7}{8}}$ seven-eighths not shaded Part

These are sample of fractions: $\mathbf{\frac{1}{8}, \frac{7}{8},}$ which has two parts, the numerator and a denominator as shown below.

$\frac{1}{8}$ → Numerator

→ Denominator

We also need to learn the following key ideas:

- All numbers except 0 has a reciprocal.
- The reciprocal of a number is 1 divided by the number.

  Examples: 1) The reciprocal of 3 is 1 divided by 3 or $\frac{1}{3}$

  2) The reciprocal of 8 is $\frac{1}{8}$

- The reciprocal of a fraction is found by simply flipping its numerator and denominator. In other words, the denominator of the original fraction is placed on top and the numerator at the bottom.

  Examples: 1) To find the reciprocal of $\frac{3}{4}$ you will just simply flip the numerator and denominator as shown.

  $\frac{3}{4} \rightarrow \frac{4}{3}$ (the numerator & denominator are interchanged)

  Therefore, $\frac{4}{3}$ is the reciprocal of $\frac{3}{4}$.

  2) The reciprocal of $\frac{2}{5}$ **is** $\frac{5}{2}$.

  3) The reciprocal of $\frac{1}{8}$ is $\frac{8}{1}$ or 8.

Let's dig deeper:

- How do we find the reciprocal of a mixed fraction? Let's find out!

  To get the reciprocal of a mixed fraction, the following are the steps:

  1.) convert the given mixed fraction into an improper fraction;

  2.) flip the numerator and denominator.

  Examples:

  1.) Find the reciprocal of $3\frac{1}{4}$.

  Step 1. We change $3\frac{1}{4}$ to an improper fraction as shown.

  $$3\frac{1}{4} = \frac{12+1}{4}$$
  $$= \frac{13}{4}$$

  Step 2. Then, we flip the numerator and denominator of $\frac{13}{4}$ making it $\frac{4}{13}$

  Therefore, the reciprocal of $3\frac{1}{4}$ is $\frac{4}{13}$.

- What will happen if we multiply a fraction or a number by its reciprocal? Let's find out!

Examples:

1.) $\frac{2}{6} \mathbf{x} \frac{6}{2} = \frac{12}{12}$ or 1

2.) $\frac{1}{6} \mathbf{x} \frac{6}{1} = \frac{6}{6}$ or 1

3.) $9 \mathbf{x} \frac{1}{9} = \frac{9}{9}$ **or 1**

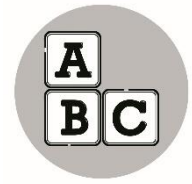
4.) $2\frac{1}{3} \text{ x } \frac{3}{7} = \frac{7}{3} \mathbf{x} \frac{3}{7}$

$= 1$

Do you see a pattern? What is the product when a fraction or a number is multiplied by its reciprocal?

Yes! The product of a fraction or a number multiplied by its reciprocal is always 1. That is why the ***reciprocal*** of a number is also called its ***multiplicative inverse.***

That was the secret of the contestants. They were able to find the value of "n" so fast, because they know that the answer is just the reciprocal or multiplicative inverse of $\frac{3}{8}$.



What's More

Let us have a practice.

Directions: Give the reciprocal of each of the following. Write your answers in your activity notebook.

1) 9
2) $\frac{1}{7}$
3) $\frac{3}{4}$
4) $\frac{5}{2}$
5) $3\frac{1}{3}$

Directions: Find the value of n in each of the following number sentences. Write your answers in your activity notebook.

1) $\frac{1}{3}$ x n = 1

2) 7 x n = 1

3) n x $\frac{6}{4}$ = 1

4) $\frac{1}{8}$ x 8 = n

5) n x $2\frac{1}{3}$ = 1

What I Have Learned

Directions: Let's have a game "Tell Me Who I Am." Write your answers in your activity notebook.

1) I am $\frac{3}{4}$, what is my reciprocal? _____
2) If I am 25, what factor is multiplied to me which give me the product of 1.
3) I am the reciprocal of $\frac{1}{2}$ .Who I am?
4) You are $\frac{5}{6}$ and I am $\frac{2}{9}$, and give us the product of $3\frac{3}{4}$. Originally who I am? _____
5) Find my product if I am $\frac{4}{5}$ and my BFF is $\frac{5}{4}$? _____

What I Can Do

Situation:
Jack, a Grade 5 pupil, answered a 7-item quiz given below. Help me evaluate the answers of Jack by writing the word "correct" if his answer is correct and "wrong" if his answer is wrong. The first one is done for you

This is the quiz that Jack answered.

Directions: Write true, if the statement is true. If not, replace the second number with the reciprocal of the first number, to make the statement true.

1) $\frac{15}{1} \times 15 = 1$
2) $\frac{24}{30} \times \frac{30}{24} = 1$
3) $9 \times \frac{9}{1} = 1$
4) $\frac{20}{5} \times 6\frac{1}{5} = 1$
5) $9\frac{2}{3} \times \frac{32}{3} = 1$
6) $7 \times \frac{1}{7} = 1$
7) $(\frac{2}{5} + \frac{1}{5}) \times \frac{5}{3} = 1$

This is the answer sheet of Jack.

Name: Jack D. Great Grade: 5 Section: Acacia

1) TRUE This is incorrect. 15 must be replaced by $\frac{1}{15}$ to make the statement true.
2) TRUE Correct!
3) TRUE
4) TRUE
5) TRUE
6) TRUE
7) TRUE

Assessment

Ready now to answer the test? Let us do it.

Directions: Fill in the blank with a number which will make the statement true. Write your answers in your activity notebook.

1) $\frac{26}{3} \times \frac{3}{26} =$ _____

2) _____ $\times \frac{28}{4} = 1$

3) $8\frac{2}{3} \times$ _____ $= 1$

4) _____ $\times \frac{35}{8} = 1$

5) $\frac{3}{5} \times \frac{5}{3} =$ _____

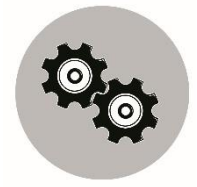
6) $\frac{1}{2} \times$ _____ $= 1$

7) $1\frac{1}{3} \times \frac{3}{4} =$ _____

8) _____ $\times 2\frac{1}{4} = 1$

9) _____ $\times \frac{2}{6} = 1$

10) _____ $\times \left(\frac{1}{2} + \frac{9}{2}\right) = 1$



Additional Activities

More practice!

Directions: Do as told. Write your answers in your activity notebook.

1) Find the sum of $\frac{1}{8}$ and $\frac{3}{8}$, then give its reciprocal.

2) Find the difference between $\frac{7}{9}$ and $\frac{2}{9}$, then give its multiplicative inverse.

3) Find the product of $\frac{1}{4}$ and $\frac{3}{4}$, then give its multiplicative inverse.

4) Find the product of $\frac{7}{9}$ and its reciprocal, then add 3 to the product. What is the sum?

5) Subtract the product of $\frac{2}{3}$ and its reciprocal to the product of $\frac{5}{7}$ and its reciprocal. What is the difference?

Answer Key

What I Know

1. b
2. c
3. d
4. b
5. c
6. b
7. c
8. c
9. b
10. b

What's In

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

What I have learned

1. $4\frac{3}{1}$
2. $\frac{25}{1}$
3. $\mathbf{2}\frac{9}{2}$
4. $\mathbf{1}\frac{9}{2}$
5. **1**

What's More

1. $\frac{1}{9}$
2. 7
3. $\frac{4}{3}$
4. $\frac{3}{2}\frac{2}{5}$
5. $\frac{3}{10}$

What I Can Do

3. Wrong! $\frac{9}{1}$ must be replaced by $\frac{1}{9}$ to make the statement true
4. Wrong! $6\frac{1}{5}$ must be replaced by $\frac{5}{20}$ to make the statement true.
5. Wrong! $\frac{32}{3}$ must be replace by $\frac{3}{29}$ to make the statement true.
6. Correct!
7. Correct!

Assessment

1. 1
2. $\frac{4}{28}$
3. $\frac{3}{26}$
4. $\frac{8}{35}$
5. 1
6. 2
7. 1
8. $\frac{4}{9}$
9. $\frac{6}{2}$ or 3
10. $\frac{2}{10}$ or $\frac{1}{5}$

Additional Activities

1. sum is $\frac{4}{8}$ or $\frac{1}{2}$
   reciprocal is 2
2. difference is $\frac{5}{9}$
   multiplicative inverse is $\frac{9}{5}$
3. product is $\frac{3}{16}$
   multiplicative inverse is $\frac{16}{3}$
4. 1 + 3 = 4
5. 1 – 1 = 0

References:

"Reciprocal of a Fraction". 2020. Mathisfun.Com. https://www.mathisfun.com/reciprocal-fraction.html.

Ursua, A. C. and A.P. Lumbre. 2016. *21st Century Mathletes Textbook*.Quezon City: Vibal Group Inc.

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