Mathematics
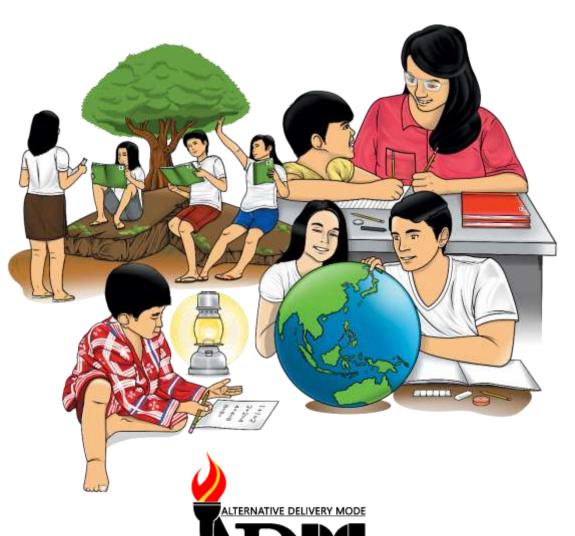
Quarter 1 – Module 6:
Finding GCF and LCM

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 1 – Module 6: Finding GCF and LCM
First Edition, 2020

5

Mathematics

Quarter 1 – Module 6:
Finding GCF and LCM

Introductory Message

For the Facilitator:

Welcome to the Mathematic 5 Alternative Delivery Mode (ADM) Module 6 on Finding the Greatest Common Factor and the Least Common Multiples!

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 Mathematic 5 Alternative Delivery Mode (ADM) Module 6 on Finding the Greatest Common Factor and the Least Common Multiples!

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 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

Good day, Mathlete! In this module, you are going to learn how to find the common factors, common multiples, the greatest common factors and least common multiples of 2-4 numbers using continuous division. These lessons will enrich your knowledge and skills in the addition, multiplication, and division of numbers.

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

- find the common factors and the GCF of 2-4 numbers using continuous division; and
- find the common multiples and least common multiples of 2-4 numbers using continuous division.

What I Know

Answer the test below. Take time to recall previous topics.

Directions: Read each statement below and write only the letter of the correct answer on your worksheet.

1) What is the greatest common factor of 4, 8, and 12?
   - A. 2
   - B. 4
   - C. 8
   - D. 12
2) Which of these sets of numbers lists exactly the common factors of 12 and 24?
   - A. 1, 2, 3, 4, 6, 12
   - B. 1, 3, 4, 5, 7, 12
   - C. 1, 2, 3, 4, 5, 24
   - D. 1, 3, 6, 9, 12, 24
3) What is the GCF of 6, 12, and 18?
   - A. 5
   - B. 6
   - C. 12
   - D. 18
4) Mario was asked to find the GCF of 42 and 49. What number did he find?
   - A. 7
   - B. 12
   - C. 14
   - D. 18
5) There are 36 girls and 16 boys in the Math Club organized by Mr. Dela Cruz. He plans to divide the same gender equally. What is the biggest number of members that each group would have?
   - A. 4
   - B. 8
   - C. 12
   - D. 16

6) What is the LCM of 8, 12 and 28?
      A. 158   C. 168
      B. 160   D. 178

7) Which of these numbers are the missing multiples in this set: (15, 30, 45, _, _, _,)?
      A. 50, 55, 60   C. 60, 75, 90
      B. 58, 75, 90   D. 75, 90, 105

8) 72 is the LCM of what numbers?
      A. 5, 9, and 36   C. 7, 9, and 36
      B. 6, 9, and 36   D. 8, 9 and 36

9) What is the LCM of 3, 9 and 12?
      A. 34   C. 36
      B. 35   D. 37

10) Which set represents the common multiples of 120?
      A. 30, 40, 60, 120   C. 30, 40, 50, 60
      B. 120, 80, 60, 40   D. 120, 240, 360, 480

Lesson 6
Finding GCF and LCM

What's In

A **prime number** is a whole number greater than 1 with only two factors, 1 and itself. For example, 2, 3, 5, 7, 11, and 13 are the first few prime numbers in the set of whole numbers. Why? Because 2 has only two factors which are 1 and 2. This is also true with 3 which also has two factors only, 1 and 3, and so as the other given prime numbers.

On the other hand, a **composite number** is a whole number greater than 1 with more than two factors. For example, 4, 6, 8, 9, and 10 are some of the composite numbers in the set of whole numbers. Why? Because 4 has three factors (1, 2, and 4), while 6 has four factors (1, 2, 3 and 6). You will notice that 8, 9 and 10 each has more than two factors also.

Factors are numbers you multiply together to get another number:

In 2 x 3 = 6, 2 and 3 are the factors of 6. Likewise, 2 and 3 are prime numbers. Hence, we can call 2 and 3 as prime factors of 6.

Example: Express 120 as a product of prime factors.

Solution: 120 = 2 x 60

2	120
2	60
2	30
3	15
	5

= 2 x 2 x 30

= 2 x 2 x 2 x 15

= 2 x 2 x 2 x 3 x 5

Doing the above method is what we call **prime factorization**.

Therefore, the prime factorization of 120 is 2 x 2 x 2 x 3 x 5.

The **prime factorization** of a number is the product of prime factors that make up that number.

ACTIVITY: Directions: Find the prime factorization of each number. Take your time and enjoy!

1) 128
2) 2 200
3) 2 250
4) 148
5) 320

6) 175
7) 340
8) 999
9) 1 620
10) 4 200

What's New

From the previous lesson, you were taught how to perform PMDAS and GMAS operations. This time, you are going to deal with finding (GCF) greatest common factor and (LCM) least common multiple.

Read and analyze the problem:

Mary and her friends were assigned to decorate their classroom. There are three pieces of ribbon measure 16 cm, 24 cm, and 40 cm, respectively. Mary wants to cut them into strips of the same length. What is the largest possible length of each strip?

If you were Mary, how are you going to do it?

What Is It

Remember:

Steps in finding the GCF using continuous division:

1. Write the numbers horizontally and find a prime number that will divide all the numbers, if possible.
2. Divide by that prime number and write the quotients below the dividends.
3. Continue the process until none of the numbers has a common prime divisor.

Note that: The GCF is the product of all the prime factors common to all the numbers given.

Consider the problem mentioned above:

Problem 1:

We want to know what is the largest possible length of each strip that Mary can cut from the three pieces of ribbon?

Solution:

$$
\begin{array}{r|ccc}
2 & 16, & 24, & 40 \\ \hline
2 & 8, & 12, & 20 \\ \hline
2 & 4, & 6, & 10 \\
& 2 & 3 & 5
\end{array}
$$

Divisors →
(Prime numbers) → Step 1, Step 2, Step 3

So, the common factors are: 2 x 2 x 2 = 8 (**Step 4**). The greatest common factor is 8.

Therefore, the longest possible length of each strip is **8 cm.**

Problem 2:

Grand Tours van route A arrives at its stop every 8 minutes. Van route B arrives at its stop across the terminal every 16 minutes. And van route C arrives at the gas station stop every 24 minutes. If all three vans are currently arriving at their stops, how many hours will pass before all three vans arrive at the same time?

Solution:

In relation to the word problem, the vans' arrival every 8, 16 and 24 minutes are presented in the table below which shows how to find the Least Common Multiple of the following set of numbers using continuous division: 8, 16 and 24.

Step 1	8 16 24	Arrange the given numbers horizontally
Step 2	2 8 16 24 2 4 8 12 2 2 4 6 1 2 3	Write the common prime divisor at the left side and the quotients below the numbers. Repeat the process until there is no common divisor left.
Step 3	The common divisors are those numbers at the leftmost part. The quotients, on the other hand are those numbers found at the bottom	
Solve for the answer	2 x 2 x 2 x 1 x 2 x 3 = 48	

So, the LCM of 8, 16, and 24 is 48.

Therefore, all three vans arrive at the same time 48 minutes later.

A) Common Factors and Greatest Common Factors

❖ Common factors are factors that are the same for two or more numbers.
❖ Greatest Common factor (GCF) is the greatest number that is a factor of two or more numbers.

Let me see if you still remember how to find the common factors and the GCF of two numbers. Study the given example.

Find the common factors and the GCF of the following numbers.

Example: 12, 16, and 18

Factors of 12 :   1, 2, 3, 4, 6, 12
Factors of 16 :   1, 2, 4, 8, 16
Factors of 18 :   1, 2, 3, 6, 9, 18
Common factors :   1 and 2
GCF: 2

1) 32 and 36   6) 24 and 48

2) 27 and 42   7) 21 and 54

3) 54 and 60   8) 72 and 81

4) 45 and 50   9) 55 and 100

5) 18 and 42   10) 120 and 180

B) Common Multiple and Least Common Multiple

❖ The multiple of a number is a product obtained when multiplying a number by a whole number.

Study the given example.

What are the multiples of 4?   The multiples of 4 are 4, 8, 12, 16, 20, 24, 28, …

Why?   This is because

$$4 \; x \; 1 \; = \; 4,$$
$$4 \; x \; 2 \; = \; 8,$$
$$4 \; x \; 3 \; = \; 12,$$
$$4 \; x \; 4 \; = \; 16,$$
$$4 \; x \; 5 \; = \; 20,$$
$$4 \; x \; 6 = \; 24, \text{ and so forth.}$$

❖ The least common multiple (LCM) of a set of numbers is the smallest non-zero that is a multiple of all numbers in a set.

Let us recall, below is an example of finding the multiples of a given number:

Example: Find the LCM of 8 and 12.

➢ Multiples of **8** = {8, 16, **24**, 32, 40, **48**, 54, **60**, …}
➢ Multiples of **12** = {12, **24,** 36, **48, 60**, 72, …}

What numbers are found in both sets?

These are **24, 48, 60**, are the common multiples of 8 and 12.

What is the smallest among these numbers? It's 24.

Thus, the **LCM** of 8 and 12 is **24**.

Do the exercises below.

Find the LCM of each set of numbers.

1) 7 and 21	6) 6, 12, and 18
2) 4, 8, and 12	7) 8, 16, and 20
3) 10, 15, and 45	8) 12, 20, and 28
4) 12, 18, and 36	9) 30, 40, and 50
5) 9, 12, and 18	10) 3, 12, and 24

What's More

Now you can apply what you have learned in finding the GCF and LCM.

A. Directions: Have a copy of this table on your worksheet, then using continuous division, fill on the correct information in each blank.

Numbers	Common Factors	GCF	First Common Multiple	LCM
1) 36, 48				
2) 12, 16, 30				
3) 24, 36, 48				
4) 14, 21, 28, 35				
5) 15, 30, 45, 60				
6) 8, 16, 32				
7) 18, 36, 72				
8) 9, 12, 18				
9) 30, 60, 80				
10) 2, 10, 20				

B. Write T if the statement given is true. If the statement is false, change the underlined numbers to make it true. Write your answers on your Math activity notebook.

1) The <u>LCM</u> of 3 x 3 x 2 and 2 x 3 x 2 is <u>2 x 2 x 2 x 3 x 3</u>.

2) <u>180</u> is the LCM of 30 and 36.

3) The LCM of 5 x 2, 3 x 2, and 3 x 5 is <u>2 x 3 x 5</u>.

4) The LCM of 15, 20 and 30 is <u>120</u>.

5) <u>140</u> is the LCM of 14, 28, and 40.

What I Have Learned

Directions: Match Column A with the answer in Column B. Write only the letter of your answer.

A	**B**
1) These are the factors of two or more numbers which are the same in all of the numbers in a set	A. GCF
	B. common factor
2) It is simply the smallest of the common multiples.	C. LCM
	D. LCD
3) This is done to determine the LCM of 2-4 numbers using continuous division for all numbers in a set.	E. Factoring
4) The greatest factor that two or more numbers share.	F. multiply the common prime divisors

What I Can Do

Let us try!

Activity 1. A. Directions: The numbers and letters inside the box show the factors of 60 in increasing order. Find the value of all the letters inside the box. Write your answer in your Math Activity Notebook. You may try another number of your choice.

1	A	B	C	D	E
F	G	H	I	J	60

B. Find and list all the factors of 225.

Activity 2: Find out if the given statements are right or wrong.

Directions: **True or False**: Mark (/) if the statement is true and (X) if the statement is false. Write your answers on your worksheet.

1) In finding the GCF of two numbers, the common factors are to be listed down.
2) The LCM of 12, 8, and 20 is 310.
3) The numbers 16, 60, and 24, has an LCM of 240.
4) The LCM of 18, 24, and 36 is 60.
5) In finding the GCF of two numbers, after the prime factors are listed it has to be divided.
6) The GCF of 20 and 28 is 2.
7) GCF is the biggest number that will divide both the given number.
8) The GCF of 30 and 24 is 6.
9) To find GCF of the given numbers may be done by prime factorization tree.
10) There is no GCF if there are no common factors of the given number.

Assessment

You may review the previous activities before you answer the test below.

Directions: Choose the letter of the correct answer. Write the answer on your worksheet.

1) What is the greatest common factor of 18, 27, and 45?
   - A. 4
   - B. 8
   - C. 9
   - D. 12

2) Which of these sets is exactly the common factors of 36 and 42?
   - A. 1, 2, 3, 6
   - B. 1, 3, 4, 12
   - C. 1, 3, 6, 12
   - D. 1, 2, 3, 24

3) What is the GCF of 12, 24, and 36?
   - A. 12
   - B. 18
   - C. 24
   - D. 48

4) Mario was asked to find the GCF of 15, 30, and 45. What number did he find?
   - A. 15
   - B. 30
   - C. 45
   - D. 60

5) Sixty notebooks, 48 ball pens, and 36 correction tapes are shared among a number of grade 5 pupils such that each gets an equal number of each kind. How many pupils will get an equal number of each kind?
   - A. 3
   - B. 8
   - C. 12
   - D. 16

6) What are the first 4 multiples of 4?
   - A. 2, 4, 8, and 12
   - B. 4, 8, 12, 16
   - C. 4, 8, 16, 20
   - D. 4, 8, 16, 24

7) Which of the following is the LCM of 24, 48, and 80?
   - A. 220
   - B. 240
   - C. 260
   - D. 280

8) What are the first 3 common multiples of 3, 4, and 6?
   - A. 12, 24, 30
   - B. 12, 24, 32
   - C. 12, 24, 36
   - D. 12, 24, 42

9) Which of these multiples is the LCM of 12, 16, and 24?
   - A. 24
   - B. 48
   - C. 54
   - D. 60

10) Alfred Jun visits the library once every 2 days. Jayson visits it once every 3 days while Justine Louie once every 4 days. They all meet one day in the library. After how many days will they meet in the library again?
   - A. 12
   - B. 16
   - C. 20
   - D. 24

Additional Activities

Directions: Copy these illustrations on your answer sheet. Write the common prime divisor at the left side of the numbers. Repeat the process until there is no common divisor left.

1) ☐ | 4   8   40
   ☐ | 2   4   20
        1   2   10
   Missing numbers: ___, ___
   LCM = ____, GCF = ____

2) ☐ | 20   30   60
   ☐ | 4   6   12
        2   ☐   6
   Missing numbers: ___, ___, ___
   LCM = ____, GCF = ____

3) 4 | 16   24   32
   ☐ | 4   6   8
        2   ☐   ☐
   Missing numbers: ___, ___, ___
   LCM = ____, GCF = ____

4) 2 | 16   24   40
   ☐ | 8   ☐   20
   2 | ☐   6   ☐
        2   ☐   ☐
   Missing numbers: ___, ___, ___
   ___, ___, ___
   LCM = ____, GCF = ____

5) 2 | 16   24   48
   ☐ | 8   ☐   ☐
        ☐   3   6
   Missing numbers: ___, ____, ___, ___
   LCM = ____, GCF = __

6) 2 | 12   24   44
   2 | 6   12   22
        ☐   ☐   ☐
   Missing numbers: ___, ___, ___
   LCM = ____, GCF = ____

7) ☐ | 10   15   20
        2   3   ☐
   Missing numbers: ___, ___
   LCM = ____, GCF = ____

8) ☐ | 18   24   36
   ☐ | 6   8   12
        3   ☐   6
   Missing numbers: ___, ___, ___
   LCM = ____, GCF = ____

9) ☐ | 20   40   50   60
        2   ☐   ☐   ☐
   Missing numbers: ___, ___, ___, ___
   LCM = ____, GCF = _____

10) 4 | 32   48   64   72
    2 | ☐   ☐   ☐   ☐
    ☐ | 4   6   8   ☐
         2   3   4   9
    Missing numbers: ___, ___, ___,
    ___, ___, ___
    LCM = _____, GCF = _____

11

Answer Key

What I Know

1. B	4. A	7. C	10. D
2. A	5. A	8. D	
3. C	6. C	9. C	

What's In

1. 128 = 2 x 2 x 2 x 2 x 2 x 2 x 2
2. 2,200 = 2 x 2 x 2 x 5 x 5 x 11
3. 2,250 = 2 x 3 x 3 x 5 x 5 x 5
4. 148 = 2 x 2 x 37
5. 320 = 2 x 2 x 2 x 2 x 2 x 2 x 5
6. 175 = 5 x 5 x 7
7. 340 = 2 x 2 x 5 x 17
8. 999 = 3 x 3 x 3 x 37
9. 1,620 = 2 x 2 x 3 x 3 x 3 x 3 x 5
10. 4,200 = 2 x 2 x 2 x 3 x 5 x 5 x 7

What's New:

a)
1. CF = 1, 2, 4   2. CF = 1, 3   3. CF = 1, 2, 3, 6
   GCF = 4   GCF = 3   GCF = 6
4. CF = 1, 5   5. CF = 1, 2, 3 (1, 2, 3, 6)
   GCF = 5   GCF = 6
6. 1, 2, 3   7. CF = 1, 3   8. CF = 1, 3, 9   9. CF = 1, 5
   GCF = 24   GCF = 3   GCF = 9   GCF = 5
   CF = 1, 2, 3, 4, 6, 8, 12, 24
10. CF = 1, 2, 3, 6 CF = 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60   GCF = 60

b)
1. 21   2. 24
3. 270 (90)   4. 144 (36)   5. 216 (36)
6. 36   7. 160 (80)   8. 420   9. 600   10. 96 (24)

What's More

A.

Numbers	Common Factors	GCF	First Common Multiple	LCM
1) 36,48	1, 2, 4 (1, 2, 3, 4, 6, 12)	4 (12)	360 (144)	360 (144)
2) 12,16,30	1, 2	2	240	240
3) 24,36,48	1, 2, 3, 4, 6, 12	12	144	144
4) 14,21,28,35	1, 7	7	420	420
5) 15,30,45,60	1, 3, 5	5	360 (180)	360 (180)
6) 8,16,32	1, 2, 4, 8	8	32	32
7) 18,36,72	1, 2, 3, 6, 9, 18	18	72	72
8) 9,12,18	1, 3	3	108 (36)	108 (36)
9) 30,60,80	1, 2, 4, 5, 10 (1, 2, 5, 10)	10	240	240
10) 2,10,20	1, 2	2	20	20

B.
1. F, (2 x2 x3 x 3)   2. T   3. T   4. F, 60   5. F, 280

What I Have Learned
1. B   2. C   3. F   4. A

What Can I Do
1. A = 2, B = 3, C = 4, D = 5, E = 6, F = 10, G = 12, H = 15, I = 20, J = 30
   1, 3, 5, 9, 15, 25, 45, 75, 225
2. 1, 5, 7, 9 = X ; 2,3,4,6,8,10 = / (X = 1, 4, 5, 7, 9) (/ = 2, 3, 6, 8, 10)
11) X   12-15 (/ or true)

Assessment

1. C   2. A   3. A   4. A   5. C   6. B   7. B   8. C   9. B   10. D

Additional Activities

1. Missing Numbers: 1,2 (2, 2); LCM = 40 GCF = 4
2. Missing Numbers: 5, 2, 3; LCM = 60, GCF = 10
3. Missing Numbers: 2, 3, 4; LCM = 96 , GCF = 8
4. Missing Numbers: 12, 2, 4, 10, 3, 5; LCM = 240, GCF = 8
5. Missing Numbers : 12, 24, 4, 2; LCM = 48, GCF = 8
6. Missing Numbers : 3, 6, 11 ; LCM = 264, GCF = 4
7. Missing Numbers: 5, 4; LCM = 60, GCF = 5
8. Missing Numbers: 3, 2, 4; LCM = 72, GCF = 6
9. Missing Numbers : 10, 4, 5, 6; LCM = 600, GCF = 10
10. Missing Numbers: 8, 12, 16, 18, 9, 2; LCM = 576, GCF = 16

References

Coronel, Carmelita C. and Nelia D. Bamba. 2010. *Mathematics for a Better Life*. SD Publication.

Kota, Manuel T., et al.. 2005. *Soaring 21ST Century Mathematics*. Phoenix Publishing House, Grade 5.

Lesson Guides in Elem. Math, Grade 5.

Today's Math, Grade 5, Third Edition.

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