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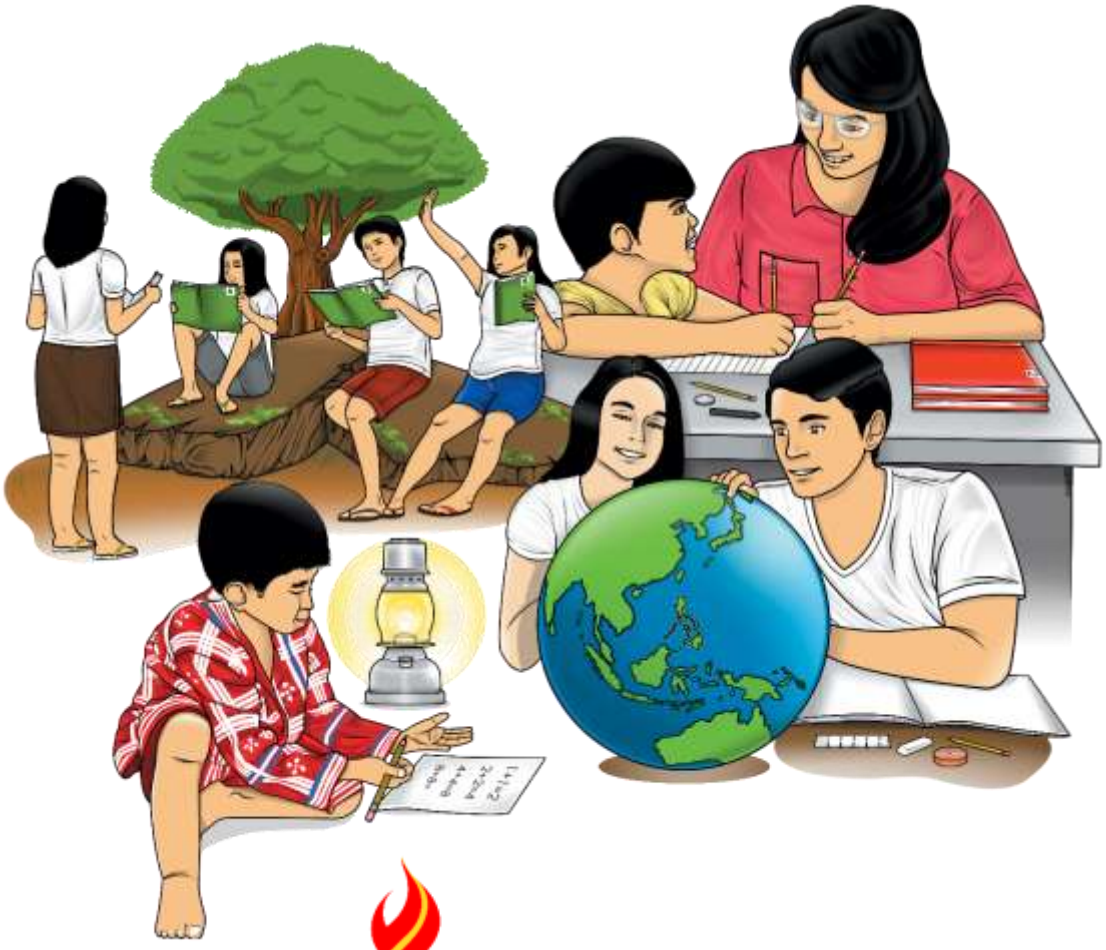
Mathematics

Quarter 1 – Module 5: Performing a Series of Operations Using PMDAS or GMDAS



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Quarter 1 – Module 5: Performing a Series of Operations Using PMDAS or GMDAS

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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 SLMS 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 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

In this module, you are going to perform a series of more than two operations on whole numbers applying the Parentheses, Multiplication, Division, Addition, Subtraction (PMDAS), or Grouping, Multiplication, Division, Addition, Subtraction (GMDAS) rule correctly.

After going through this module, you are expected to:

- state, explain and interpret the PMDAS or GMDAS rule; and
- apply PMDAS or GMDAS rule in simplifying numbers with a series of operations.

What I Know

Directions**:** Simplify the expressions below. Write the letter of the correct answer on your notebook.

1) 40 ÷ 2 x 4 + 6 = ____
A. 11 B. 20 C. 46 D. 86

2) (15 – 6) + (4 – 1) x 24 = ____
A. 81 B. 91 C. 151 D. 288

3) (2 x 30) + (90 ÷ 2) = ____
A. 95 B. 105 C. 115 D. 125

4) 3 x [3+2 x (10 - 3)] = ____
A. 51 B. 77 C. 79 D. 105

5) 12 + 3 x [4 + (9 – 8) – 2] = ____
A. 21 B. 27 C. 45 D. 63

6) 18 ÷ 6 x 4 – 3 + 6 = ____
A. 3 B. 11 C. 15 D. 20

7) 14 – 8 + 3 + 8 x 24 ÷ 8 = ____
A. 27 B. 33 C. 37 D. 43

8) 4 x 5 + (14 + 8) – 36 ÷ 6 = ____
A. 36 B. 56 C. 86 D. 95

9) (28 ÷ 4) + 3 + (10 – 8) x 5 = ____
A. 20 B. 51 C. 60 D. 77

10) (17 – 7) x 6 + 2 + 56 - 8 = ____
A. 21 B. 63 C. 66 D. 110

Lesson 1 Performing a Series of Operations Using PMDAS or GMDAS

What's In

You may recall, the rules on order of operations by performing the expressions given below.

1) 4 + 6 - 9 =
2) 13-5 x 2 + 3=
3) 45 ÷ 5 -10 ÷ 5 =
4) 15 – 5 + 2 =
5) 7 x 6 + (64 ÷8) =

What's New

Did you know that there is a rule that can help us when solving a series of operations? The rule is called **PMDAS,** which stands for **P**arentheses, **M**ultiplication, **D**ivision, **A**ddition, and **S**ubtraction. It may also be called GMDAS when other **G**rouping symbols are used.

The PMDAS or GMDAS rule tells us that in simplifying expressions involving a series of operations, we first simplify all operations inside the **Parentheses** (**( )**) or other **Grouping Symbols** like braces ({ }) and brackets (**[ ]**). Second, perform Multiplication or Division, whichever comes first from left to right. Third, do the Addition or Subtraction, whichever comes first from left to right also.

Study this example. What should be the correct answer to this one?

(10 ÷ 2 x 5) x (14 + 6 – 4) + 2

What Is It

The sample numerical expression above involves a series of operations, we will apply PMDAS or GMDAS rule in simplifying this expression. We start from the expression inside the parentheses, and these are:

(**10 ÷ 2 x 5**) and (**14 + 6 – 4**)

Since there are also operations inside the parentheses, we will also apply PMDAS or GMDAS rule, thus we have:

(**10 ÷ 2** x 5) x (**14 + 6** – 4) + 2	Simplify the operations inside the parentheses. Divide 10 by 2, and Add 14 and 6.
= (5 x 5) x **(20 – 4)** + 2	Multiply 5 by 5 and Subtract 4 from 20.

When the operations inside the parentheses have already been simplified, we can already remove the parentheses. Thus, we have:

= 25 x 16 + 2

The operations that remains are multiplication and addition. Using PMDAS, we will simplify the expression **from left to right.**

Simplifying further, the rules say, multiplication should be done first before addition; thus, we have:

= 25 x 16 + 2	Multiply 25 by 16.
= 400 + 2	Then, add 400 and 2.
= 402	

So, **(10 ÷ 2 x 5) x (14 + 6 – 4) + 2** is equal to **402.**

Consider this another example:

20 + (10 – 15 ÷ 3) x 3

In simplifying this expression, we start from the expression inside the parentheses, that is

(10 – 15 ÷ 3)

Applying the PMDAS or GMDAS rule, division must be done first before subtraction, thus we have:

20 + **(**10 – **15 ÷ 3)** x 3	Divide 15 by 3.
= 20 + (10 – 5) x 3	

To eliminate the parentheses, we have to perform the operation inside, thus we have:

20 + **(10 – 5)** x 3	Subtract 5 from 10.
= 20 + 5 x 3	

To simplify further, we need to apply the PMDAS or GMDAS rule, in which multiplication should be done first before subtraction, thus we have:

20 + **5 x 3**	Multiply 5 by 3.
=20 + 15	Then, Add 20 and 15.
= 35	

So, **20 + (10 – 15 ÷ 3) x 3** is equal to **35**

Study the following additional examples.

Find: 10 + 2 – 5 + 3

The operations are addition and subtraction. Using PMDAS, we will simplify the expression **from left to right.**

10 + 2 – 5 + 3	Add 10 and 2.
= 12 – 5 + 3	Subtract 5 from 12.
= 7 + 3	Add 7 and 3.
= 10	

So, ***10 + 2 – 5 + 3*** is equal to **10.**
Find: ***(8 × 5 + 15) ÷ 5 – 6***

(8 × 5 **+** 15***)*** ÷ *5* – 6	Solve the expression inside the parentheses. Multiply 8 and 5 first.
=(40 + 15) ÷ *5* – 6	Add 40 and 15.
= 55 ÷ *5* – 6	Divide 55 by 5.
= 11 – 6	Then, Subtract 6 from 11
= 5	

So, ***(8 × 5 + 15) ÷ 5 – 6*** is equal to **5.**

What's More

Independent Activity 1

Directions: Fill in the blanks to complete each solution. The first item is done for you to serve as a guide.

1. [(12 – 3) + (18 ÷ 6) x 3]
= **9** + 3 x 3
= **9** + **9**
= **18**

2. (7 x 9) – 3 + 8
= __ – 3 + 8
= __ + 8
= ___

3. 18 – (12 ÷ 6) +7
= 18 – __ + 7
= __ + 7
= ___

4. 7 – 5 + 8 x (16 ÷ 4)
= 7 – 5 + 8 x __
= 7 – 5 + __
= 2 + __

5. (10 x 6) ÷ (9 - 3 + 6)
= 60 ÷ (9 - 3 + 6)
= 60 ÷ (__ + 6)
= 60 ÷ __

Independent Activity 2

Directions: Put ☺ if the numerical expression is simplified correctly and put ☹ if the numerical expression is solved incorrectly.

___1) 15 – 3 + 20 ÷ 5 × 3
= 15 – 3 + 4 x 3
= 15 – 3 + 12
= 12 – 12
= 0

___2) (6 × 6) – 9 + 8
= 36 – 9 + 8
= 36 – 17
= 19

___3) 22 – 15 ÷ 7 + 10
= 7 ÷ 7 + 10
= 1 + 10
= 11

____4) (4 × 6 ÷ 3) – 7 + 7
= (24 ÷ 3) – 7 + 7
= 8 – 7 + 7
=1 + 7
= 8

____5) 25 ÷ 5 × 4 – 15 + 12
= 25 ÷ 20 – 15 + 12
= 25 ÷ 5 + 12
= 5 + 12
= 17

Independent Activity 3

Directions: In column A are numerical expressions and their corresponding answers are written in column B. Write the letter that corresponds to the correct answer on a separate sheet of paper.

A	**B**
___ 1) 6 + (9 ÷ 3 x 4)	A. 9
___ 2) 3 x [(9 + 15) ÷ 8]	B. 35
___ 3) 4 x [18 ÷ 2 x (10 – 8)]	C 10
___ 4) (15 – 6) + (4 – 1) x 8	D. 18
___ 5) 2 x [3 + 2 x (10 - 9)]	E. 72
	F. 71

What I Have Learned

Supply the missing term in the blank.

In performing a series of operations on whole numbers involving more than two operations using the **(PMDAS) or (GMDAS)** rule, you must;

First, perform all operations inside the (1) _____ or (2) _____ symbol, provided that you will multiply or divide first, whichever comes first, from left to right before adding or subtracting, whichever comes first, from left to right;

Second, perform all (3) _____ and (4) _____, whichever comes first from left to right; and

Third, perform all (5) _____ and (6) _____, whichever comes first from left to right.

What I Can Do

A. Directions: Perform the operations. Choose the correct answers in the P/GMDAS card. Write your answer in your activity notebook.

P	G	M	D	A	S
4	18	20	56	64	28

1) (9 – 2) + (3 × 7)

2) (18 + 14) ÷ (6 + 2)

3) (36 ÷ 6 + 4 × 4 – 2)

4) (36 – 6) + 3 × 9 + 7

5) 4 × (35 – 25) + 16

B. Directions: Below are incomplete expressions. Complete them by finding the missing numbers from the numbers provided in the lower box. Write your answer in your activity notebook.

1) 70 ÷ __ + 5 + 4 – 3 = 16
2) (6 x __ + 2) - 25 = 13
3) 3 x (4 + 4) – __ = 20
4) 5 x 3 + 25 ÷ __ = 20
5) __ ÷ 2 – 3 + 2 x 2 = 6

7 4 5 6 10 12

Assessment

Directions**:** Solve the expressions given below applying PMDAS and GMDAS rules. Write your answer on a separate sheet of paper.

1) 60 x 3 ÷ 4 + 5 = ____

A. 50 B. 65 C. 75 D. 180

2) (14 – 6) + (3 – 1) x 24 = ____

A. 34 B. 56 C. 111 D. 240

3) (3 x 30) + (100 ÷ 5) = ____

A. 90 B. 185 C. 110 D. 140

4) 2 x [3+2 x (10 - 3)] = ____

A. 70 B. 35 C. 34 D. 40

5) 11 + 3 x [4 + (9 – 8) – 2] = ____

A. 45 B. 20 C. 27 D. 63

6) 18 ÷ 6 x 4 – 3 + 6 = ____

A. 15 B. 11 C. 3 D. 20

7) 14 – 8 + 3 + 8 x 24 ÷ 8 = ____

A. 27 B. 33 C. 43 D. 37

8) 4 x 5 + (14 + 8) – 36 ÷ 6 = ____

A. 56 B. 95 C. 36 D. 86

9) (28 ÷ 4) + 3 + (10 – 8) x 5 = ____

A. 20 B. 60 C. 51 D. 77

10) (17 – 7) x 6 + 2 + 56 – 8 = ____

A. 66 B. 21 C. 110 D. 63

Additional Activities

Directions: Solve each expression. Write ☺ if the expression is correct and write ☹ if the expression is incorrect. Write your answer in your Math Activity notebook.

5) 20 ÷ 2 x 3 – 8 = 22

4) 10 + 30 ÷ 2 x 3 = 75

3) 12 + 4 x 6 ÷ 8 = 12

2) 35 ÷ 5 x 7 – 9 + 9 = 49

1) 9 x 3 – 50 ÷ 5 + 15 = 32

Answer Key

What's In

1. 10-9= 1
2. 16-10= 6
3. 9-2 = 7
4. 15 – 7= 8
5. 42 + 8 =50

Assessment

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

What's More

Independent Activity 1

1. 9,9,9,18
2. 63,60,68
3. 2,16,23
4. 32,32,34
5. 6,12,5

What I have Learned

1. parenthesis
2. grouping symbol (can be interchanged)
3. multiplication
4. division (can be interchanged)
5. addition
6. subtraction

What's More

Independent Activity 3

1. d
2. a
3. e
4. b
5. c

What's More

Independent Activity 2

1. ☹
2. 😠
3. 😠
4. ☹
5. 😠

Additional Activities

1. ☹
2. ☺
3. 😠
4. 😠
5. ☹

What I Can Do

A.	B.
1. S – 28	1. 7
2. P – 4	2. 6
3. M – 20	3. 4
4. A – 64	4. 5
5. D – 56	5. 10

What I Know

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

References

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

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