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DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for Mathematics

Quarter 3
Lesson
7

Lesson Exemplar for Mathematics Grade 7
Quarter 3: Lesson 7 (Week 7)
SY 2024-2025

Development Team

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MATHEMATICS / QUARTER 3 / GRADE 7

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
A. Content Standards	The learners should have knowledge and understanding of simplification of numerical expressions involving integers.
B. Performance Standards	By the end of the quarter, the learners are able to simplify numerical expressions involving integers. (NA)
C. Learning Competencies and Objectives	***Learning Competency*** By the end of the lesson, the learners are able to … 1. simplify numerical expressions involving integers using number properties and the order of operations (GEMDAS) 2. solve problems involving numerical expressions
D. Content	GEMDAS (Grouping, Exponents, Multiplication and Division, Addition and Subtraction) Application to real-life situations
E. Integration	

II. LEARNING RESOURCES
Smar Class 4 Kids. (2024). Order of Operations in Math. https://smartclass4kids.com/order-of-operations/ Laing, L. (n.d.). Back-to-School Shopping: Applying the order of operations. *Math for grownups.* https://mathforgrownups.com/back-to-school-shopping-applying-the-order-of-operations/ ChatGPT. (2022). https://chat.openai.com/c/ba996feb-6668-459c-9c2e-2460f7ff2683 CueMath. (n.d.). PEMDAS. https://www.cuemath.com/numbers/pemdas/ Pierce, R. (2023). Order of Operations: PEMDAS. *Math is Fun.* https://www.mathsisfun.com/operation-order-pemdas.html Basic Mathematics. (2021). Order of operations word problems. https://www.basic-mathematics.com/order-of-operations-word-problems.html

III. TEACHING AND LEARNING PROCEDURE		**NOTES TO TEACHERS**
A. Activating Prior Knowledge	**DAY 1** **1. Short Review** **Pretest or activity to review.** Let the learners answer the short activity. Perform the indicated operations on integers and give the results.	Teachers in this part will recall prior knowledge of learners to assess the depth of their understanding of addition and

	1) 6 – 12 + 2 = _____ = **–4** 2) 11 + 14 – 2 = _____ = **23** 3) –12 – 5 – 10 = _____ = **–27** 4) 5 + 13 + 6 = _____ = **24** 5) 3 (−4) = _____ = **–12** 6) (−5) (−9) = _____ = **45** 7) −3 (4) = _____ = **–12** 8) −7 (−8) = _____ = **56** 9) 8 (−9) = _____ = **–72** 10) (−12) (12) = _____ = **–144** 11) −24 ÷ 12 = _____ = **–2** 12) −45/9 = _____ = **–5** 13) −80 ÷ −4 = _____ = **20** 14) −75 ÷ 25 = _____ = **–3** 15) −60 ÷ −30 = _____ = **2** 16) −68 ÷ −2 = _____ = **34** **2. Feedback (Optional)**	subtraction of integers and their concepts before engaging students in the new lesson. If the teacher is not satisfied with the response of the learners to the short review activity, the teacher may add activities to cultivate their necessary knowledge. Students can do this in a separate worksheet provided. The teacher should provide feedback on every activity
B. Establishing Lesson Purpose	**1. Lesson Purpose** Consider the following scenario: Maria bought 3 boxes of pencils, each containing 8 pencils at P2 per pencil. She also bought 2 notebooks at P5 each. If she gives the cashier P100, how much change should she receive? **Essential Questions:** 1. How many pencils are there? 2. How many operations do you think there are in this problem? 3. Can you solve this problem using only one numerical expression? To solve this problem, it is important to understand the order of operations and the concept of GEMDAS. **2. Unlocking Content Area Vocabulary** **GEMDAS** stands for Grouping, Exponents, Multiplication and Division, and Addition and Subtraction. This means that in simplifying numerical expressions, the operation one should work on first is the Grouping symbols (parenthesis, brackets, or braces), then Exponents, Multiplication and Division next, and lastly Addition and Subtraction. That is, in simplifying numerical expressions, the order of operations should follow GEMDAS.	In this part, the teacher will explain the importance of learning GEMDAS. The teacher may also use the essential questions to engage students on why it is crucial to learn the lesson. The teacher has the discretion to use other appropriate methods.
C. Developing and Deepening Understanding	**SUB-TOPIC 1: Simplifying numerical expressions involving integers** **1. Explicitation** GEMDAS stands for Grouping, Exponents, Multiplication and Division, and Addition and Subtraction. This means that in simplifying numerical expressions, follow the order of operations according to the GEMDAS Rule.	Make sure that students already learned the four fundamental operations of integers.

For easy memory, use these mnemonics: ***G**race, **E**xcuse **M**y **D**ear **A**unt **S**ally*

Step 1. Any calculation that comes inside the Grouping symbol should be done first. This includes ( ), [ ], and { }. If you have all these three grouping symbols, perform first ( ), then [ ], and lastly { }.

If there are no grouping symbols, skip this step.

Step 2. After solving operations inside the parenthesis or groupings (if any), exponents, roots, and absolute values will be calculated from left to right.

If there are none of these, skip this step.

Step 3. Perform multiplication or division, whichever comes first when calculating from left to right.

Example: $12 \div 3 \times 4$

$12 \div 3 \times 4$

$4 \times 4 = 16$ is the correct answer (rather than $12 \div 12 = 1$)

Step 4. Lastly, perform addition or subtraction, whichever comes first when calculating from left to right.

Example: $12 - 3 + 4$

$12 - 3 + 4$

$9 + 4 = 13$ is the correct answer (rather than $12 - 7 = 5$)

The teacher discusses GEMDAS thoroughly after presenting Example 1.

2. Worked Example

Example 1. Simplify $8 - 3 \times 2$.

(Ask students to solve without introducing GEMDAS)

Solution: Following GEMDAS, since there is no Grouping and no Exponent, we start with Multiplication and Division (whichever comes first, M or D). So, we start computing $3 \times 2 = 6$.

Simplify: $8 - 3 \times 2 = 8 - 6$ (Multiplication)

$= \mathbf{2}$ (Subtraction)

The teacher may ask students to answer this before introducing GEMDAS.

The teacher explains these examples step by step, focusing on the importance of GEMDAS.

DAY 2

Example 2. Simplify the following.

1) $5 - 2 \times (6 + 1)$

Solution: $5 - 2 \times (6 + 1) = 5 - 2 \times 7$ (Grouping: Step 1)

$= 5 - 14$ (Multiplication: Step 3)

$= -9$ (Subtraction: Step 4)

2) $4^2 \div (3 - 1) + 6$
Solution: $4^2 \div (3 - 1) + 6 = 4^2 \div 2 + 6$ (Grouping)
$= 16 \div 2 + 6$ (Exponent)
$= 8 + 6$ (Division)
$= 14$ (Addition)

3) $3 \times (5 - 2)^2 + 4$
Solution: $3 \times (5 - 2)^2 + 4 = 3 \times 3^2 + 4$ (Grouping)
$= 3 \times 9 + 4$ (Exponent)
$= 27 + 4$ (Multiplication)
$= 31$ (Addition)

4) $2^3 + 6 \div (3-1)$
Solution: $2^3 + 6 \div (3-1) = 8 + 6 \div 2$ (Grouping and Exponent)
$= 8 + 3$ (Division)
$= 11$ (Addition)

5) $10 - 3 \times (2^2 + 1)$
Solution: $10 - 3 \times (2^2 + 1) = 10 - 3 \times (4 + 1)$ (Exponent in the Grouping)
$= 10 - 3 \times 5$ (Grouping)
$= 10 - 15$ (Multiplication)
$= -5$ (Subtraction)

3. Lesson Activity

Practice/Drill 1. Simplify the following numerical expressions.

1. $4 + 3 \times 2 =$ _____ **= 10**
2. $7 - (2 \times 3)^2 =$ _____ **= – 29**
3. $2^4 + 8 \div (3 + 1) =$ _____ **= 18**
4. $(6 + 2) \times 3 - 25 =$ _____ **= – 1**
5. $10 - 2 \times (4 - 1) =$ _____ **= 4**
6. $3^2 + (4 \div 2) =$ _____ **= 11**
7. $15 \div (2+1) - 4^2 =$ _____ **= – 11**
8. $2 \times (7 - 3) + 5^0 =$ _____ **= 9**
9. $12 - 2 \times (3^2 - 1) =$ _____ **= – 4**
10. $(8 + 2)^2 \div 5 - 21 =$ _____ **= – 1**

Students may answer this on a separate worksheet provided.

Collaborative Learning:
The teacher has the discretion to provide groups with 1 or 2 or 3 expressions each and instruct them to solve and discuss their strategies.

DAY 3

SUB-TOPIC 2: Application to Real-Life Situations

1. Explicitation

We often do problems involving numerical expressions, without even thinking of the order of operations. And that's because we are not writing equations or expressions to solve problems. We simply use common sense. Here are some examples.

Students may answer this on a separate worksheet provided.

$1000 - 300 - 50 - (3 \times 40) - (2 \times 200) =$ **P130**
$P100 - [P2 \times (3 \times 8)] - (P5 \times 2) =$ **P42**

	2. Worked Example Example 1. Let us say you are shopping for school supplies. You have chosen 5 notebooks that are ₱50 each and 2 pens at ₱30 each. But the notebooks are ₱5 off. What is the total amount you must pay? Solution: You probably will not write an equation for this, right? You probably just do it in your head, and scribble some on scrap paper or use a calculator. So, you might have done something like this: First, the pens: there are 2 pens at P30 each, which is a total of ₱60 because $2 \times ₱30 = ₱60$. Now for the notebooks: there are 5 notebooks at ₱50 each, but they are ₱5 off. So, notebooks cost ₱45 (50 – 5). Hence, the total for notebooks is $5 \times ₱45 = ₱225$. Finally, simply add the cost of the pens and the cost of the notebooks: ₱60 + ₱225 = ₱285. This is easy, right? And surprise, surprise! It used the order of operations. Did you realize that? Here's how: 2 pens × ₱30 + 5 notebooks × (₱50 – P5) = $2 \times 30 + 5 \times 45$ (Grouping) = 60 + 225 (Multiplication) = ₱285 (Addition). Therefore, you have to pay a total of ₱285. Example 2. Maria paid ₱500 for the ingredients of her special milk tea. She made 20 milk teas and sold 12 milk teas for ₱30 each. The other 8 milk teas were sold for ₱40 each. How much is Maria's profit? Solution: Profit is Revenue minus Cost or P = R – C Revenue is (the number of items sold) times (the price per item) Profit = [(12 milk teas × ₱30) + (8 milk teas x ₱40)] – P500 = (₱360 + ₱320) – ₱500 = ₱680 – ₱500 = ₱180 Maria's profit. Therefore, Maria's profit is ₱180.	Option: Collaborative learning

	3. Lesson Activity **Practice/Drill 2.** Write a numerical expression to represent the situation and then solve it. 1. John withdrew ₱P1000 from his bank account. He used ₱300 for gas, ₱50 to buy a cellphone load, bought 3 pens for ₱40 each, and sponsored to watch a movie with a special friend at a cinema for ₱200 each. How much money is left for John? 2. Maria bought 3 boxes of pencils, each containing 8 pencils at ₱2 per pencil. She also bought 2 notebooks at ₱5 each. If she gives the cashier ₱100, how much change should she receive?	
D. Making Generalizations	**1. Learners' Takeaways** **A. Generalization Questions** 1. How do you remember the order of operations of numerical expressions? 2. How do you determine if your answer to a numerical expression problem is correct? 3. Why do you think the order of operations is important? **B. General Statements** GEMDAS stands for Grouping, Exponents, Multiplication and Division, and Addition and Subtraction. This means that in simplifying numerical expressions, the operation one should work first is the Grouping symbols (parenthesis, brackets, braces) then Exponents, Multiplication and Division next, and lastly Addition and Subtraction. That is, in simplifying numerical expressions, the order of operations should follow GEMDAS according to the steps outlined in this lesson. For easy memory, use these mnemonics: ***G**race, **E**xcuse **M**y **D**ear **A**unt **S**ally* **2. Reflection on Learning (Optional)**	The teacher may ask questions that lead to abstractions of the lesson. The teacher may ask students to give a generalization statement. In this part, students may write a reflection about the importance of the lesson in real-life representation.

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		**NOTES TO TEACHERS**
A. Evaluating Learning	**DAY 4** **1. Formative Assessment** **A. Simplifying numerical expressions** Answer the following numerical expressions with solutions. (2 points each)	Students may answer this on a separate worksheet provided.

	1) Solve $5 + 3 \times 2$. **= 11** 2) Evaluate $4^2 \div (3 + 1) - 6$. **= –2** 3) Simplify $3 \times (5 - 2)^2 + 4$. **= 31** 4) Find the value of $2^3 + 6 \div (3 - 1)$. **= 11** 5) If $x = 4$ and $y = 2$, what is the value of $x^2 + 2 \times y$? **= 20** 6) Calculate $7 - 2 \times (4 + 1)$. **= –3** 7) Simplify $9 \div (2 + 1) + 2^2$. **= 7** 8) If $a = 3$ and $b = 2$, find $a^2 + b \times 3 - 1$. **= 14** 9) Evaluate $10 - 3 \times (2^2 - 1)$. **= 1** 10) What is the result of $(5 + 1)^2 \div 4 - 2$? **= 7** **B. Word Problems** Write the numerical expression to represent the situation and then solve it. (5 points each) 1. Peter withdrew P10,000 from his bank account. He used P3,000 to fix his car, P500 for gas, and bought 4 new tires for P1,600 each. How much money is left for Peter? 2. Roxanne bought 3 boxes of apples, each containing 24 apples at P5 each. She also bought 2 boxes of bananas at P280 per box. If she gives the cashier P1,000, how much change should she receive? **2. Homework (Optional)**			The teacher has the discretion to use other methods. $10{,}000 - 3000 - 500 - (4 \times 1600)$ = **P100** $1000 - (5 \times 3 \times 24) - (2 \times 280)$ = **P80**
B. Teacher's Remarks	*Note observations on any of the following areas:*	**Effective Practices**	**Problems Encountered**	The teacher may take note of some observations related to the effective practices and problems encountered after utilizing the different strategies, materials used, learner engagement, and other related stuff. Teachers may also suggest ways to improve the different activities explored/lesson exemplar.
	strategies explored			
	materials used			
	learner engagement/ interaction			
	others			

C. Teacher's Reflection	*Reflection guide or prompt can be on:* • *principles behind the teaching* *What principles and beliefs informed my lesson?* *Why did I teach the lesson the way I did?* • *students* *What roles did my students play in my lesson?* *What did my students learn? How did they learn?* • *ways forward* *What could I have done differently?* *What can I explore in the next lesson?*	Teacher's reflection in every lesson conducted/facilitated is essential and necessary to improve practice. You may also consider this as an input for the LAC/Collab sessions.