BASIC 9

WEEKLY LESSON PLAN – WEEK 8

Strand:	Number		**Sub-Strand:**	Fractions, decimals and Percentages	
Content Standard:	B9.1.3.1 Apply the understanding of operations on fractions to solve problems involving fractions of given quantities and round the results to given decimal and significant places				
Indicator (s)	B9.1.3.1.2 Add and/or subtract, multiply and/or divide given fractions, using the principle of order of operations including the use of the BODMAS or PEMDAS rule, and apply the understanding of these to solve problems. B9.1.3.1.3. Review word problems involving basic operations on fractions.		**Performance Indicator:** Learners can simplify fractions using BODMAS and PEDMAS.		
Week Ending	01-11-2024				
Class	B.S.9	**Class Size:**		**Duration:**	
Subject	Mathematics				
Reference	Mathematics Curriculum, Teachers Resource Pack, Learners Resource Pack, Textbook.				
Teaching / Learning Resources	Poster, Video		**Core Competencies:**	• Demonstrate behaviour and skills of working towards group goals • Ability to select alternative(s) that adequately meet selected criteria	

DAYS/DATE	**PHASE 1 : STARTER**	**PHASE 2: MAIN**	**PHASE 3: REFLECTION**
MONDAY	Discuss the meaning of "Order of Operations" in Mathematics with the Learners.	1. Using a Poster bearing definitions, differentiate between BODMAS and PEDMAS. 2. Demonstrate on using BODMAS to simplify whole number expressions with more than two operations. 3. Assist Learners to simplify whole number expressions using BODMAS. 4. Discuss with the Learners on how to use PEDMAS to simplify whole number expressions. **BODMAS Rule Definition** According to the rule, to solve any mathematical expression, first, solve the terms written inside the brackets, then simplify exponential terms and move ahead to division and multiplication operations, then, at last,	Learners brainstorm to solve more questions on simplifying whole number expressions using BODMAS and PEDMAS. **Exercise;** 1. Simplify the expression by using the PEMDAS rule: $18÷(8-2×3)$ 2. Simplify the expression by using the PEMDAS rule: $(4×3÷6+1)×3^2$ 3. **Solve** $8+9÷9+5×2-7$ by using BODMAS 4. Simplify $[25-3(6+1)]÷4+9$ using BODMAS 5. Solve $(14+18)(14+18)$of 64 using BODMAS.

addition and subtraction.

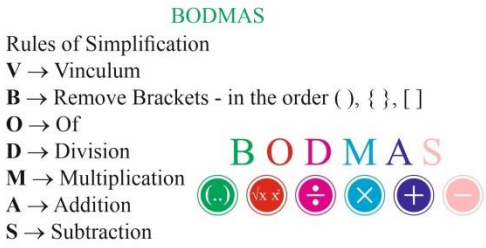
Here, multiplication and division can be considered level one operations as they must be solved first, addition and subtraction can be considered level two operations.

Simplification of terms inside the brackets can be done directly. This means we can perform the operations inside the bracket of division, multiplication, addition, and subtraction.

Sticking to this order of operations in the BODMAS rule always gives the correct answer. If there are multiple brackets in an expression, all the same brackets can be solved simultaneously.

Example, $(31+2)\div(13-2)=33\div11=3(31+2)\div(13-2)=33\div11=3$

Look at the below diagram to understand the terms and operations denoted by the BODMAS acronym in the proper order.



BODMAS
Rules of Simplification
V → Vinculum
B → Remove Brackets - in the order ( ), { }, [ ]
O → Of
D → Division
M → Multiplication
A → Addition
S → Subtraction
B O D M A S

What is PEMDAS?

PEMDAS is an order of operation used in mathematics to deal easily with complex calculations. It states that we start solving any arithmetic expression by solving the terms written in parentheses or brackets and then we simplify exponential terms and move ahead to multiplication and

division operations and then, at last, we can find the answer by solving addition and subtraction operations.

PEMDAS Rules

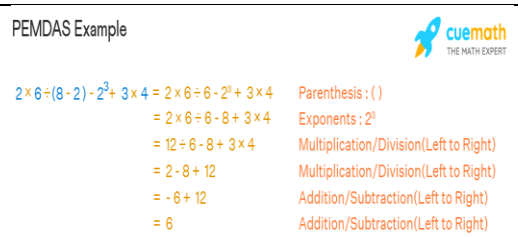
PEMDAS is a set of rules which are followed while solving mathematical expressions. These rules start with **Parentheses**, and then operations are performed on the **exponents** or powers. Next, we perform operations on **multiplication or division** from left to right. Finally, operations on **addition or subtraction** are performed from left to right.

P	**[{( )}]**	**Parentheses**
E	x^2	Exponents
M D	× OR ÷	Multiplication OR Division
A S	+ OR -	Addition OR Subtraction

If you stick to this order of operations in the PEMDAS rule, you will always get the correct answer. The following acronym will help you remember the PEMDAS Rule.

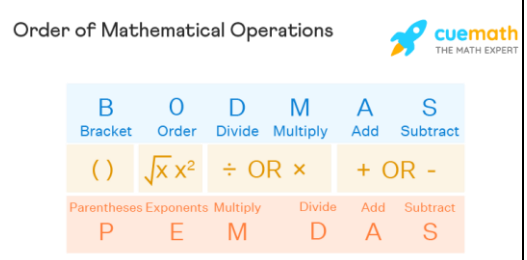
Please **E**xcuse **M**y **D**ear **A**unt **S**ally

Let us understand PEMDAS with the help of an example.



BODMAS vs PEMDAS

The PEMDAS rule is similar to the BODMAS rule. There is a difference in the abbreviation because certain terms are known by different names at different locations.



When to Use PEMDAS?

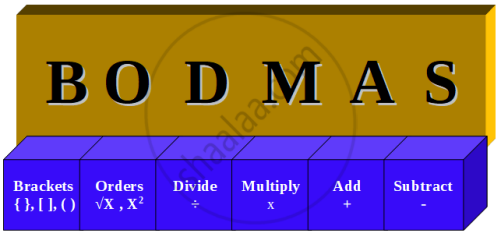
When there is more than one operation in a mathematical expression, we use the PEMDAS method. PEMDAS in Math gives you a proper structure to produce a unique answer for every mathematical expression. There is a sequence of certain rules that need to be followed when using the PEMDAS method. Once you get the hang of these rules, you can do multiple steps at once.

Points to Remember

- Operations in brackets should be carried out first.
- Next, solve the exponents in the expression.
- Move from left to right and carry out multiplication or division, whichever comes first.
- Move from left to right and carry out addition or subtraction, whichever comes first.

Common Mistakes while using PEMDAS rule in Math

There is a chance of making mistake in the presence of multiple brackets. If we

		don't know which bracket to solve first, it could lead to an incorrect answer. In the case of nested brackets (one bracket inside the other), just follow one rule "focus on the innermost bracket first". Note that we still follow the rule PEMDAS if multiple operations are involved inside a bracket as shown below. We will now learn how to solve this expression with multiple brackets. 4 + 3 [8 - 2 (6 - 3)] ÷ 2 = 4 + 3 [8 – 2(3)] ÷ 2 (∵ 6 - 3 = 3) = 4 + 3 [8 – 6] ÷ 2 (∵ 2(3) = 6) = 4 + 3 [2] ÷ 2 (∵ 8 – 6 = 2) = 4 + 6 ÷ 2 (∵ 3 × 2 = 6) = 4 + 3 = 7	
WEDNESDAY	Demonstrate on simplifying fractions with more than two operations using BODMAS.	1. Assist Learners to practice simplifying fractions with more than two operations using BODMAS. 2. Learners in small groups to discuss and simplify fractions with more than two operations using PEDMAS. 3. Call a representative from each group to come to the chalkboard to solve examples of simplifying fractions with more than two operations using PEDMAS.  **Examples on simplification of fractions:** **1.** 3 1/3 ÷ 5/3 - 1/10 of 2 ½ + 7/4 **Solution:** 3 1/3 ÷ 5/3 - 1/10 of 2 ½ + 7/4 = (3 × 3 + 1)/3 ÷ 5/3 – 1/10 of (2 × 2 + 1)/2 + 7/4 = 10/3 ÷ 5/3 - 1/10 of 5/2 + 7/4	Through questions and answers, conclude the lesson. **Exercise;** Simplify the following using BODMAS; **.** 4/7 ÷ [1 2/7 - 3/14] **2.** 7 + {1/3 + 2/9 × (7/4 - 5/12) } **3.** {(10 1/3 - 2/9) ÷ 5/18} of (3/8 + 1/4) **4.** 4 1/3 - {17/4- (5 1/4 × 2 1/2) } **5.** 71/3 - 21/4 (2 1/5 × 3/4) **6.** 15/21 of 45/3 – 1/15 ÷ 3/7 **7.** 3/16 + 13/16 ÷ 2 9/15 ÷ 1 1/3 **8.** ¾ of 16/27 + 23/14 + 12/18 **9.** 7/9 × 1 1/5 ÷ 8/15 **10.** (1/5 + 4/5) of 3 1/3

		['of' simplified] = 10/3 × 3/5 – ½ × ½ + 7/4 ['÷' simplified] = 2/1 - ¼ + 7/4 ['×' simplified] = (2 × 4)/(1 × 4) - (1 × 1)/(4 × 1) + (7 × 1)/(4 × 1) = 8/4 - ¼ + 7/4 [Now the denominators are same of all the fractions] = (8 – 1 + 7)/4 ['+' and '-' simplified] = 14/4 = 7/2 = 31212 **2.** 45 of 3/5 ÷ 1 2/3 + 3 of 1/3 – 10 **Solution:** 45 of 3/5 ÷ 1 2/3 + 3 of 1/3 – 10 = 45 of 3/5 ÷ (1 × 3 + 2)/3 + 3 of 1/3 – 10 = 45 of 3/5 ÷ 5/3 + 3 of 1/3 – 10 = 45 × 3/5 ÷ 5/3 + 3 × 1/3 – 10 ['of' simplified] = 9 × 3 × 3/5 + 3 × 1/3 – 10 ['÷' simplified], ['×' simplified] = (27 × 3)/5 + 1 – 10 = 81/5 + 1 – 10 = (81 × 1)/(5 × 1) + (1 × 5)/(1 × 5) – (10 × 5)/(1 × 5) = 81/5 + 5/5 – 50/5 [Now the denominators are same of all the fractions]	

		= (81 + 5 – 50)/5 ['+' and '-' simplified] = 36/5 = 7 1/5 **3.** 43 of 1/86 ÷ 1/14 × 2/7 + 9/4 – ¼ **Solution:** 43 of 1/86 ÷ 1/14 × 2/7 + 9/4 – ¼ = 43 × 1/86 ÷ 1/14 × 2/7 + 9/4 – ¼ = 2/1 + 9/4 – ¼ = (2 × 4)/(1 × 4) + (9 × 1)/(4 × 1) - (1 × 1)/(4 × 1) = 8/4 + 9/4 - 1/4 [Now the denominators are same of all the fractions] = (8 + 9 - 1)/4 = 16/4 = 4 **4.** 9/10 ÷ (3/5 + 2 1/10) *Solution:* 9/10 ÷ (3/5 + 2 1/10) = 9/10 ÷ (3/5 + 21/10) = 9/10 ÷ ((6 +21)/10) [Solve within brackets] = 9/10 ÷ 27/10 = 9/10 × 10/27	

		= 1/3 **5.** (7 ¼ - 6 1/4) of (2/5 + 3/15) *Solution:* (7 ¼ - 6 1/4) of (2/5 + 3/15) = (29/4 – 25/4) of (2/5 + 3/15) = ((29 – 25)/4) × ((6 + 3)/15) [Solve within brackets] = 4/4 × 9/15 [Reduce to lowest term] = 1 × 3/5 = 3/5	

FRIDAY	Review Learners knowledge on word problems involving fractions.	1. Learners brainstorm to create word problems involving fractions. 2. Assist Learners to solve word problems based on fractions. 3. Engage Learners in solving problems with division of fraction. **Example 1**: Rachel rode her bike for one-fifth of a mile on Monday and two-fifths of a mile on Tuesday. How many miles did she ride altogether? Analysis: To solve this problem, we will add two fractions with like denominators. Solution: $\frac{1}{5}+\frac{2}{5}=\frac{1+2}{5}=\frac{3}{5}$ Answer: Rachel rode her bike for three-fifths of a mile altogether. Example 2: Stefanie swam four-fifths of a lap in the morning and seven-fifteenths of a lap in the evening. How much farther did Stefanie swim in the morning than in the evening? Analysis: To solve this problem, we will subtract two fractions with unlike denominators. Solution: $\frac{4}{5}=\frac{12}{15}$ $-\frac{7}{15}=\frac{7}{15}$ $\frac{5}{15}=\frac{1}{3}$ Answer: Stefanie swam one-third of a lap farther in the morning. Example 3: It took Nick five-thirds of an hour to complete his math homework on Monday, three-fourths of an hour on Tuesday, and five-sixths of an hour on Wednesday. How many hours did he take to complete his homework altogether?	Through questions and answers, conclude the lesson. **Exercise;** 1. Dina added five-sixths of a bag of soil to her garden. Her neighbor Natasha added eleven-eighths bags of soil to her garden. How much more soil did Natasha add than Dina? 2. At a pizza party, Diego and his friends ate three and one-fourth cheese pizzas and two and three-fourths pepperoni pizzas. How much pizza did they eat in all? 3. The Cocozzelli family drove their car for five and five-sixths days to reach their vacation home, and then drove for six and one-sixth days to return home. How much longer did it take them to drive home? 4. warehouse has 12 and nine-tenths meters of tape in one area of the building, and eight and three-fifths meters of tape in another part. How much tape does the warehouse have in all? 5. An electrician has three and seven-sixteenths cm of wire. He needs only two and five-eighths cm of wire for a job. How much wire does he need to cut?

		Analysis: To solve this problem, we will add three fractions with unlike denominators. Note that the first is an improper fraction. Solution: $\frac{5}{3} = \frac{20}{12}$ $\frac{3}{4} = \frac{9}{12}$ $+\ \frac{5}{6} = \frac{10}{12}$ $\frac{39}{12} = 3\frac{3}{12} = 3\frac{1}{4}$ Answer: It took Nick three and one-fourth hours to complete his homework altogether	

Name of Teacher: **School:** **District:**