

**MATH LEVEL 2**  
**LESSON PLAN 2**

**TERMS AND EXPRESSION**

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**Section 1: Terms**

1. A term is made up of multiplication (x) and division (÷).

**Example of a term:  $6 \times 2 \div 3$**

In this term the x and ÷ apply to the number to their right.

2. To reduce a term we move multipliers to the top and divisors to the bottom of a line as follows. The divisors at the bottom are multiplied to each other because division becomes multiplication when reversed.

$$8 \div 7 \times 5 \div 8 \times 7 = \frac{8 \times 5 \times 7}{7 \times 8}$$

We cancel out the same number above and below the line because they reduce to 1.

$$\frac{8 \times 5 \times 7}{7 \times 8} = \frac{\cancel{8} \times 5 \times \cancel{7}}{\cancel{7} \times \cancel{8}} = 5$$

3. In general we divide the top numbers by the bottom numbers. This is similar to reducing fractions.

$$22 \div 7 \times 14 \div 11 = \frac{\overset{2}{\cancel{22}} \times \overset{2}{\cancel{14}}}{\underset{1}{\cancel{7}} \times \underset{1}{\cancel{11}}} = 2 \times 2 = 4$$

☺ **EXERCISE**

**Find the value of the following terms.**

**(a)  $7 \div 3 \times 6$     (b)  $9 \div 2 \times 4$     (c)  $30 \div 5 \div 2 \div 3 \times 5$     (d)  $24 \div 2 \times 4 \div 3 \times 2 \div 4$**

Answer: (a) 14 (b) 18 (c) 5 (d) 8

☺ **EXERCISE**

**Reduce the following terms to a number.**

**(a)  $6 \times 16 \times 5 \div 5 \div 6 \div 8$                       (d)  $8 \times 23 \times 15 \div 5 \div 23 \div 8$**   
**(b)  $21 \div 8 \times 2 \div 21 \times 8$                       (e)  $17 \div 8 \times 5 \div 17 \times 8$**   
**(c)  $13 \div 2 \div 5 \div 13 \times 10$                       (f)  $24 \div 8 \div 2 \div 24 \times 32$**

Answer: (a) 2 (b) 2 (c) 1 (d) 3 (e) 5 (f) 2

**Section 2: Terms & Expression**

4. When terms are joined by addition (+), subtraction (−), they make up an expression.

**Example of an expression:  $2 \times 7 - 27 \div 3 + 4 \div 12 \times 9$**

The following expression is made up of three terms, separated by + and –.

$$\underline{2 \times 7} - \underline{27 \div 3} + \underline{4 \div 12 \times 9}$$

5. Please note that a term can be a single number. You identify terms by underlining them between + and –.

$$\underline{16 \div 8} + \underline{9} - \underline{2 \times 3}$$

### 😊 EXERCISE

**Do not reduce. Simply identify how many terms there are in each expression.**

- (a)  $5 \times 9 \div 3 + 32 \div 2 \div 2 \div 2$       (d)  $3 + 5 \times 4 - 8 \div 4 \times 3 + 7$   
(b)  $21 \div 8 + 2 \div 21 - 8$                       (e)  $6 \times 16 \times 5 \div 5 \div 6 \div 8$   
(c)  $13 - 2 + 5 - 13 + 10$                       (f)  $36 - 6 - 6 - 6 - 6 - 6 - 6$

Answer: (a) 2 terms (b) 3 terms (c) 5 terms (d) 4 terms (e) 1 term (f) 7 terms

## **Section 3: Reducing Expressions**

6. To reduce an expression, we first reduce each individual term, and then reduce the whole expression.

**We reduce the above term as follows.**

$$\begin{aligned} 2 \times 7 - 27 \div 3 + 4 \div 12 \times 9 &= \underline{2 \times 7} - \underline{27 \div 3} + \underline{4 \div 12 \times 9} \\ &= 14 - 9 + 3 \\ &= 8 \end{aligned}$$

7. Here is example of reducing terms first and then the expression.

$$\begin{aligned} \text{Expression} &= 4 \times 7 - 9 \times 3 + 8 \div 2 \\ &= \underline{4 \times 7} - \underline{9 \times 3} + \underline{8 \div 2} \\ &= 28 - 27 + 4 \\ &= 5 \end{aligned}$$

8. Here is another example of reducing terms first and then the expression.

$$\begin{aligned} \text{Expression:} & 13 - 2 \times 5 + 13 + 10 \times 24 \div 16 + 5 \\ &= \underline{13} - \underline{2 \times 5} + \underline{13} + \underline{10 \times 24 \div 16} + \underline{5} \\ &= 13 - 10 + 13 + 15 + 5 \\ &= 36 \end{aligned}$$

9. The expression within parentheses represents a single number: Therefore, parentheses are reduced first to a single number.

$$\begin{aligned} \text{Expression:} & (16 + 6) \div 11 + 5 \\ &= \underline{22 \div 11} + \underline{5} \\ &= 2 + 5 \\ &= 7 \end{aligned}$$

## 😊 EXERCISE

Reduce the following expressions

- (a)  $8 + 2 \times 4$       (d)  $(3 + 8) \times 5$       (g)  $4 \times 3 + 2 \times 5$   
(b)  $8 \times 2 + 4$       (e)  $6 + 5 \times 3$       (h)  $4 + 3 \times 2 + 5$   
(c)  $3 + 8 \times 5$       (f)  $6 \times (5 + 3)$       (i)  $4 + 3 \times (2 + 5)$

Answer: (a) 16 (b) 20 (c) 43 (d) 55 (e) 21 (f) 48 (g) 22 (h) 15 (i) 25

## **Section 4: Order of Operations**

10. The logical order of operations is as follows:

The most basic operation is COUNTING

### **Order 0: COUNTING**

ADDITION is “Repeated Counting”. The reverse of addition is SUBTRACTION. We may resolve addition and subtraction at the same level.

### **Order 1: ADDITION & SUBTRACTION**

MULTIPLICATION is “Repeated Addition”. The reverse of multiplication is DIVISION. We may resolve multiplication and division at the same level.

### **Order 2: MULTIPLICATION & DIVISION**

Expressions in parentheses are treated as a single number. Therefore, such expressions are resolved within the isolation of parentheses.

We, therefore resolve an expression in the following order

- a) **Operations in parentheses first**
- b) **Multiplication and division next**
- c) **Addition and subtraction after that**

11. The order of operations is automatically taken into account when we reduce the terms first and then reduce the expression.

12. Schools teach the order of operations as PEMDAS (Please Excuse My Dear Aunt Sally) This “order” results in error when multiplication is carried out before division, and addition is carried out before subtraction without understanding the signs of numbers.

$$6 \div 2 \times 3 = 9 \quad \text{and} \quad \text{NOT} \quad 1 \quad \text{as per PEMDAS}$$

$$8 - 5 + 3 = 6 \quad \text{and} \quad \text{NOT} \quad 0 \quad \text{as per PEMDAS}$$

## 😊 EXERCISE

Reduce the following expressions to a number

- (a)  $6 \times 6 - 5 \times 6 + 3 \div 3 + 3 \div 3 - 4$       (d)  $3 + 5 \times 4 - 8 \div 4 \times 3 + 7 - 12 \div 3$   
(b)  $18 \div 9 + 55 \div 11 - 21 \div 3 + 2 + 1$       (e)  $21 \div 3 - 21 \div 7 + 8 \times 3 \div 12 + 13$   
(c)  $8 \div 4 \times 3 - 4 \times 4 \div 2 + 6 \div 15 \times 5$       (f)  $13 - 2 \times 5 + 13 + 10 \times 24 \div 16 + 5$

Answer: (a) 4 (b) 3 (c) 0 (d) 20 (e) 19 (f) 36

## ☺ ADDITIONAL EXERCISE

Reduce the following expressions to a number

- (a)  $8 \times 3 \div 12$  = \_\_\_\_\_  
(b)  $13 - 16 \div 8$  = \_\_\_\_\_  
(c)  $20 \times 3 \div 5 \div 6$  = \_\_\_\_\_  
(d)  $3 \times 4 + 9 \div 3$  = \_\_\_\_\_  
(e)  $60 \div 4 \div 3 \div 5$  = \_\_\_\_\_  
(f)  $2 \times 6 \times 7 \times 1 \div 14$  = \_\_\_\_\_  
(g)  $21 \times 6 \div 7 \div 3$  = \_\_\_\_\_  
(h)  $5 \times 6 \div 10 + 5 \times 8 \div 20$  = \_\_\_\_\_  
(i)  $5 \div 6 \times 5 \times 12 \div 25$  = \_\_\_\_\_  
(j)  $8 \times 6 + 12 \times 5 \div 3 + 12$  = \_\_\_\_\_  
(k)  $21 \times 35 \times 24 \div 49 \div 15 \div 12$  = \_\_\_\_\_  
(l)  $128 \div 2 \div 2 \div 2 \div 2 \div 2 \div 2 \div 2 \div 2$  = \_\_\_\_\_  
(m)  $56 \times 54 \div 6 \times 5 \div 8 \div 9$  = \_\_\_\_\_  
(n)  $6 \times 6 - 6 \times 6 + 3 \div 3 - 3 \div 3 + 4$  = \_\_\_\_\_  
(o)  $18 \div 11 \times 55 \div 14 \times 21 \div 9$  = \_\_\_\_\_  
(p)  $8 \div 6 \times 3 + 4 \times 2 - 2 \times 6 \div 4$  = \_\_\_\_\_

Answer: (a) 2 (b) 11 (c) 2 (d) 15 (e) 1 (f) 6 (g) 6 (h) 5 (i) 2 (j) 80 (k) 2 (l) 1 (m) 35 (n) 4 (o) 15 (p) 9

## ☺ L2 Lesson Plan 2: Check your Understanding

1. Explain term and expression.
2. Indicate the terms by underlining them.  
(a)  $6 \times 6 - 5 \times 6 + 3 \div 3 + 3 \div 3 - 4$   
(b)  $8 \div 4 \times 3 - 4 \times 4 \div 2 + 6 \div 15 \times 5$
3. Reduce the following expressions to a single number?  
(a)  $4 + 3 \times (2 + 5)$   
(b)  $13 - 2 \times 5 + 13 + 10 \times 24 \div 16 + 5$

***Check your answers against the answers given below.***

### **Answer**

- 1) A term is made up of numbers joined by multiplication (x) and division ( $\div$ ). A term can be a single number. Terms are joined by addition (+) and subtraction ( $-$ ) to generate an arithmetic expression.
- 2) (a)  $6 \times 6$  -  $5 \times 6$  +  $3 \div 3$  +  $3 \div 3$  - 4  
(b)  $8 \div 4 \times 3$  -  $4 \times 4 \div 2$  +  $6 \div 15 \times 5$
- 3) (a) 25  
(b) 36