Lesson Guide

In

Elementary Mathematics

Grade 6

Chapter I

Whole Number

Comprehension of whole number

DEPARTMENT OF EDUCATION
BUREAU OF ELEMENTARY EDUCATION
in coordination with
ATENEO DE MANILA UNIVERSITY

2010

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Lesson Guides in Elementary Mathematics
Grade VI

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The Lesson Guides in Elementary Mathematics were developed by the Department of Education through the Bureau of Elementary Education in coordination with the Ateneo de Manila University. These resource materials have been purposely prepared to help improve the mathematics instruction in the elementary grades. These provide integration of values and life skills using different teaching strategies for an interactive teaching/learning process. Multiple intelligences techniques like games, puzzles, songs, etc. are also integrated in each lesson; hence, learning Mathematics becomes fun and enjoyable. Furthermore, Higher Order Thinking Skills (HOTS) activities are incorporated in the lessons.

The skills are consistent with the Basic Education Curriculum (BEC)/Philippine Elementary Learning Competencies (PELC). These should be used by the teachers as a guide in their day-to-day teaching plans.
## MATRIX IN ELEMENTARY MATHEMATICS
### Grade VI

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<td></td>
<td></td>
<td></td>
<td></td>
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</table>
Meaning of Expression

I. Learning Objectives

Cognitive: Define expression
Translate word phrases to numerical expressions
Psychomotor: Write the correct numerical expressions
Affective: Appreciate good deeds of past presidents

II. Learning Content

Skills: 1. Defining expressions
2. Translating mathematical phrases to expressions
References: BEC PELC A.1.1.1
Materials: Chart, stopwatch, pictures of Philippine Presidents
Value: Nationalism

III. Learning Experiences

A. Preparatory Activities

1. Drill on Giving Terms or Phrases that Refer to Addition, Subtraction, Multiplication, or Division

   Game
   a) Divide the class into 2 groups.
   b) Teacher gives an operation, say “addition.”
   c) Each member of the groups simultaneously goes to the board and writes a term or phrase that refers to the given operation. Ex. more than, increased by, plus, added to, etc.
   d) Within 2 minutes, each group has to write as many terms or phrases as they can. Afterwards, the teacher checks and counts the correct answers.
   e) Repeat the same process with subtraction, multiplication, and division.
   f) The group with the most number of correct answers wins.

2. Motivation

   a) Let the pupils name the different Presidents of the Philippines from President Emilio Aguinaldo to President Gloria Macapagal-Arroyo. Show them the pictures of the different presidents and let them identify each.
   b) Ask: What expression describes President Emilio Aguinaldo? (The First President of the Philippine Republic)
      What expression describes President Manuel L. Quezon? (President of the Philippine Commonwealth)
      Ask the same questions on the other Presidents.
   c) Why should we remember our past Presidents? Cite their good deeds.
   d) If we use expressions to describe the Presidents, we also use expressions in Mathematics, to describe relationships between numbers and the operations being used.

B. Developmental Activities

1. Presentation

   Present the lesson using the activity cards:
a. Activity 1 – Use of Chart
Study the chart below.

<table>
<thead>
<tr>
<th>Word Phrases</th>
<th>Numerical Expressions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four times ten divided by five</td>
<td>((4 \times 10) \div 5)</td>
</tr>
<tr>
<td>Twelve diminished by two</td>
<td>(12 - 2)</td>
</tr>
<tr>
<td>Six times three added to seven</td>
<td>((6 \times 3) + 7)</td>
</tr>
<tr>
<td>Eight added to the product of five and three</td>
<td>(8 + (3 \times 5))</td>
</tr>
<tr>
<td>Twenty-five added to two</td>
<td>(2 + 25)</td>
</tr>
<tr>
<td>Three times twenty-five less twenty</td>
<td>((3 \times 25) - 20)</td>
</tr>
<tr>
<td>The quotient of 36 and 6</td>
<td>(36 \div 6)</td>
</tr>
<tr>
<td>The sum of three and thirty-nine divided by seven</td>
<td>((3 + 39) \div 7)</td>
</tr>
</tbody>
</table>

Ask: What are the mathematical terms used in the phrases? What terms denote addition? subtraction? multiplication? division?

b. Activity 2 - “Create Your Own” (By Pairs)
Each student thinks of 3 mathematical expressions involving at least 2 operations. (Use only whole numbers.)

Ex. 25 more than the product of 6 and 4
The product of the sum and difference of 8 and 5

Then he/she exchanges with a partner and translates the mathematical phrases into expressions.
Check the answers.

2. Practice Exercises
Write an expression for the following:
   a. your age less three
   b. your age plus nine
   c. your age plus twice your age
   d. thrice your age
   e. your age plus your seatmate’s age
   f. your age 5 years ago
   g. your age 6 years from now

3. Generalization
What is an expression?
How do you translate word phrases into expressions?

C. Application
1) In a film showing sponsored by the dramatic club, a ticket costs \(\text{₱}50\) for members. What will be the expression for non-members if the ticket costs \(\text{₱}5\) more than the members?
2) The boat fare for an adult in going to the province is \(\text{₱}1,700\). Write the expression for the boat fare of children if the cost is half the price for adults and there are 20 children.
3) The cost of one salted egg is \(\text{₱}6.50\). What is the expression if one buys a dozen and each egg costs \(50\text{¢}\)?

IV. Evaluation

A. Which expression is correct? Choose between A or B.
1. The sum of eleven and nineteen.
   a. $11 \times 19$  
   b. $11 + 19$
2. Eight decreased by five
   a. $8 - 5$  
   b. $8 \times 5$
3. Twelve plus thirty-six
   a. $12 + 36$  
   b. $12 \times 36$
4. Five less than seven
   a. $5 \times 7$  
   b. $7 - 5$
5. Four times the sum of two and five
   a. $4 \times (2 + 5)$  
   b. $4 \times (5 - 2)$

B. Write the expression for the following:
1. Seventy-five decreased by five
2. Fourteen divided by the sum of three and four
3. Triple the sum of eleven and six
4. One more than the product of six and eight
5. Twenty plus five less than eighty
6. Take away 10 from 50
7. Four more than twice three
8. Difference of 17 and 8
9. The sum of $\frac{1}{3}$ of 60 and $\frac{1}{2}$ of 50
10. One fourth of the product of $(24 \times 5)$

C. Write an expression for each problem/situation.
1. Helen is thirteen years old. Helen’s father is four years more than twice her age.
2. Edna is 155 cm tall. Lilia’s height is ten cm less than twice Edna’s height.
3. Roman weighs 25 kg. His father weighs five kg less than three times Roman’s weight.
4. Francis is ten years old. Ben is twice as old as Francis.
5. Aning is five years old. I am six years more than thrice her age.

V. Assignment

Write five examples of mathematical phrases with their corresponding translation to numerical expressions.

Meaning of Equation

I. Learning Objectives

Cognitive:  
Give the meaning of equation

Psychomotor:  
Write simple equation

Affective:  
Appreciate the creation of God

II. Learning Content

Skill:  
Giving the meaning of equation

Reference:  
Math Textbook, BEC PELC A.1.1.

Materials:  
pictures, map of the Philippines and charts

Value:  
Love of Nature
III. Learning Experiences

A. Preparatory Activities

1. Review/Drill

- Divide the class into 4 groups
- Teacher give an operation, say addition
- Each member of the group simultaneously goes to the board and writes a term or phrase that refers to the given operation.
  e.g. more than, increased by, plus, added to.. etc.

2. Motivation

Show the map of the Philippines and give 5 names of active volcanoes.
Pupils will paste the name of volcano where it is located in the map.

Examples:

<table>
<thead>
<tr>
<th>Province</th>
<th>Volcano</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batangas</td>
<td>Taal</td>
</tr>
<tr>
<td>Albay</td>
<td>Mayon</td>
</tr>
<tr>
<td>Negros Oriental/Occidental</td>
<td>Kanla-on</td>
</tr>
<tr>
<td>Camiguin</td>
<td>Hibok-hibok</td>
</tr>
<tr>
<td>Sorsogon</td>
<td>Bulusan</td>
</tr>
</tbody>
</table>

B. Developmental Activities

1. Presentation

a. You have associated the volcano to the province where it is located

   Where is Mt. Mayon located?
   Show a picture of Mt. Mayon. Let the pupils describe it.

   Say: The Philippines is an archipelago of more than 7 100 islands. Most of these islands are of volcanic origin. There are 37 volcanoes and 18 are still active. What is the number of volcanoes that are inactive? Write a number sentence to solve the problem.
   
   \[37 - 18 = 19\]

b. Use of illustration

   Refer to the figure.

   ![Diagram](image)

   Write a number sentence to find the number of small squares in the figure.

   \[4 \times 6 = 24\]
Check the number sentence that you’ve made by counting the number of squares in the figure. Is your number sentence true? Are the two quantities equal?

2. **Fixing Skills**

Complete the equation.

a. $18 - \Box = 5 + 6$

b. $\Box^2 = 8^2$

c. $2 + 2 + 2 = 3\Box$

d. $(2 \times 10) \cdot (13 + 7) = 20^2$

e. $3 (4 + 4 + 4) = \Box^2$

3. **Generalization**

What is an equation?

An equation is mathematical sentence formed by placing an equal sign (=) between two expressions.

C. **Application**

Show the table at the right to the pupils.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bath soap</td>
<td>P55.50</td>
</tr>
<tr>
<td>Toothpaste</td>
<td>P55.50</td>
</tr>
<tr>
<td>Shampoo</td>
<td>P64.50</td>
</tr>
<tr>
<td>Toothbrush</td>
<td>P79.50</td>
</tr>
</tbody>
</table>

Ask: a) Which two items that can be purchased with P100 without change?

b) What is the total cost of 2 bath soaps and a toothpaste? Write the equation.

IV. **Evaluation**

A. Find the value of $N$ that will make the statement TRUE.

1.) $2N + 5 = 45$

2.) $N = 10 (7+11)$

3.) $N + 15 = 35 - N$

4.) $\frac{N}{5} = 20$

5.) $2 (N + 6) = 22$

B. Write an expression for each problem/situation on the blanks.

1. Helen is 13 years old, Helen’s father is 4 years more than twice her age.  

2. Edna is 155 cm tall. Lilia’s height is 10 cm less than twice Edna’s height.

3. Roman weights 25 kilograms. His father weighs 5 kg less than 3 times Romans weight.

4. Francis is ten years old. Ben is twice as old as Francis.

5. Aning is five years old. I am six years more than thrice her age.
V. Assignment

1. Four friends share a box of pens. Each receives 3 pens. Write and solve the equation to find the number of pens in the box.
2. There are 56 pupils in a class. Thirty-six of them joined the fieldtrip. Write an equation to find the number of pupils who did not join the fieldtrip.
3. A can travels at an average span of 36 km per hour. Write and solve an equation to predict how many hours it will take to travel 432 km if it continues at this speed.

Meaning of Power, Exponent, and Base

I. Learning Objectives

| Cognitive: | Give the meaning of exponent, and base |
| Psychomotor: | Evaluate an expression in solving exponent and base |
| Affective: | 1. Appreciate beauty |
| | 2. Be clean and orderly |

II. Learning Content

| Skill: | Giving the meaning of exponent, and base |
| Reference: | Math Textbook, BEC PELC A.1.1.1 |
| Materials: | chart, roulette |
| Value: | Be clean and orderly |

III. Learning Experiences

A. Preparatory Activities

1. Review/Drill

a) Activity 1 – Spinning the Roulette

Spin the double roulette and give the answer.

b) Activity 2

Let the pupils describe the pattern shown.

Let them draw the next figure in the pattern.

How many squares are there in the 2\textsuperscript{nd} figure? in the 3\textsuperscript{rd} figure?
Discover the rule in finding the next figure?
How many squares will be in the fifth figure?
2. Motivation

a) Show pictures of the map of the Philippines and of General Emilio Aguinaldo and let them read the following sentences.
1) General Emilio Aguinaldo is the First President of the Philippine Republic.
2) The Philippines is in Southeast Asia.
3) Most Filipinos celebrate Christmas in the 10th month of the year.
b) Ask them which sentence is true or false. Let them tell why.
c) If sentences can be true or false, in mathematics there are sentences that are either true or false.

B. Developmental Activities

1. Presentation

a) Activity 1
Rhoda has to sew a tablecloth 9 dm by 9 dm for their square-shaped table in the living room. How big is the area of the tablecloth?

Answering questions about the problem
a. How will you find the area of the tablecloth?
b. What number sentence will be used to solve the problem?
c. Are the two quantities equal?
d. Write the equation about the problem. (9 x 9 = 81)
e. How many times did you multiple 9 to get 81? The product 9 x 9 can be written as power of $9^2$ where 9 is the base and 2 is the exponent.

The exponent tells how many times the base is used as a factor to form a product.
The base is the factor which is to be multiplied by itself the number of times indicated in the exponent to obtain the product.

f. In the problem, how big is the tablecloth to be sewed by Rhoda?
g. Write the equation for the problem in exponential notation of the problem.

Valuing:

a) Who has to sew a tablecloth?
b) Where will she put the tablecloth?
c) If you were Rhoda, will you also sew a tablecloth? Why?

b) Activity 2
The side of a small cutout square is 7cm. What is its area?
Write an expression about the problem.
What is the equation?

Can you write 7 x 7 in another way? How?
What do you call 7 in $7^2$? 2 in $7^2$?
What is the exponent? base?
c) **Activity 3 – Use of Illustration**

Look at the figure. Use detachable cubes

![Diagram of a cube with dimensions 2 cm x 2 cm x 2 cm]

How many □ □ □ are there in the figure?

Write a number sentence to find the number of □ □ □ in the figure.

Give the equation.
What is meant by $2^3$?
Identify the base and the exponent.

The expressions $9^2, 7^2$, and $2^3$ are called **powers**. $9^2$ is the second power of 9, $7^2$ is the second power of 7 and $2^3$ is the third power of 2. How will you write the fourth power of 3? What is its numerical value? How will you write the fifth power of 7? What is its numerical value?

2. **Fixing Skills**

   a. Give the base and the exponent in each of the following orally.
      1. $2^3$
      2. $4^2$
      3. $7^3$
      4. $1^8$
      5. $6^4$

   b. Complete the equation.

      a) $18 - \square = 5 + 6$
         \[ \square = 11 \]
      d) $96 - \square = \square + 24$
         \[ \frac{72}{72} = 72 \]

      b) $\square^2 = 10 \times \square$
         \[ \frac{100}{100} = 100 \]
      e) $1 + \square + \square = \square \times 1$
         \[ \frac{6}{6} = 6 \]

      c) $\square^3 = 8\square$
         \[ \frac{64}{64} = 64 \]

3. **Generalization**

   What is an exponent? base?

C. **Application**

   a. Rewrite each of the following using exponents. Determine the numerical value.
      1. second power of 7
      2. fourth power of 5
      3. $2 \times 2 \times 2 \times 2 \times 2$
      4. $8 \times 8 \times 8$
      5. $15 \times 15$
b. Write the >, < or = in the box to make the statement true.

1.) \(5^2 \square 2^5\)
2.) \(7^2 \cdot 3 \square 2 \cdot (70) + 3\)
3.) \(2(3^2 + 2^2) \square 8^2\)
4.) \(3^2 + 3^2 + 3^2 \square 3 \cdot (3^2)\)
5.) \(6 \cdot (2 + 3)^2 \square 3 + 7^2\)

IV. Evaluation
A. Evaluate
   1.) \(6 \cdot 2^2 + 7\)
   2.) \(3 \cdot 7^2 + 5 \cdot 5^2\)
   3.) \(9^5 - 7^2 + 10\)
   4.) \(2^5 \cdot 5^2 - 3^2 \cdot 4^3\)
   5.) \((10 + 2)^2 - 10^2\)

B. Find the value of \(n\) to make the statement true
   1.) \(2^n = 16\)
   2.) \(4 \cdot 5^n = 4 \cdot 125\)
   3.) \(7^3 = n\)
   4.) \(2 \cdot 10^n = 2 \cdot 000\)
   5.) \(3 \cdot 2^n = 192\)

C. Write the base, exponent, value, equation, and the meaning of the following expressions.
   Number 1 is done for you.

<table>
<thead>
<tr>
<th>Base</th>
<th>Exponent</th>
<th>Meaning</th>
<th>Value</th>
<th>Equation</th>
</tr>
</thead>
</table>
| 1) \(5^3\) | 5        | 3       | 125    | \(5 \cdot 5 \cdot 5 = 125\)
|        |          |         |        | or \(5^3 = 125\)          |
| 2) \(3^4\) |          |         |        |                           |
| 3) \(6^3\) |          |         |        |                           |
| 4) \(2^5\) |          |         |        |                           |
| 5) \(10^5\) |          |         |        |                           |
| 6) \(9^3\) |          |         |        |                           |
| 7) \(8^2\) |          |         |        |                           |

V. Assignment
A. Give at least 5 applications of exponent in daily life.
B. Evaluate
   1.) \((-\frac{1}{2})^2\)
   2.) \((18)^3\)
   3.) \((1 + 0.5)^2\)
   4.) \((\frac{3}{4})^3\)
   5.) \((0.1)^4\)

C. Write the equation for this problem.
   Olive has some cookies. If she gave 5 cookies each to some girls, she would have 14 left. If she gave 9 cookies each to some girls, she would be short of 14 cookies. How many girls did Olive give the cookies to? Ans. \((5 \cdot n) + 14 = (9 \cdot n) - 14\)
Expressions involving Exponents

I. Learning Objectives

Cognitive: Evaluate an expression involving exponents
Psychomotor: Write numbers in exponent form
Affective: Show love, care and concern for people with terminal illness

II. Learning Content

Skill: 1. Giving the meaning of exponent and base
        2. Evaluating expressions involving exponents
Reference: BEC PELC II A.1.1.1.2, A.1.1.1.3
Materials: flash cards, charts, activity cards
Value: Care and Concern for patients

III. Learning Experiences

A. Preparatory Activities

1. Drill

   Game: Think and Try
   Can you find a pair of numbers whose sum is equal to their product?
   Example: \(2 + 2 = 2 \times 2 = 4\)
   Expected Answers: \(3 + 1.5 = 3 \times 1.5 = 4.5\)
   \(5 + 1.25 = 5 \times 1.25 = 6.25\)
   \(11 + 1.1 = 11 \times 1.1 = 12.1\)

2. Motivation
   Ask: What are the different dreaded diseases? (TB, cancer, etc.)
   Today we are going to read something about cancer cells.

B. Developmental Activities

1. Presentation
   Read the selection below (written on the chart).
   In a particular clinical research, a special type of cancer cells affecting the skin
   was discovered to exist as a pair in the beginning and was found out to double every
   24 hours. The table shows the listing of the number of cancer cells present for the
   first 10 days.

<table>
<thead>
<tr>
<th>Day Number</th>
<th>Number of Cancer Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>(2) (2) = 4</td>
</tr>
<tr>
<td>3</td>
<td>(4) (2) = 8</td>
</tr>
<tr>
<td>4</td>
<td>(8) (2) = 16</td>
</tr>
<tr>
<td>5</td>
<td>(16) (2) = 32</td>
</tr>
<tr>
<td>6</td>
<td>(32) (2) = 64</td>
</tr>
<tr>
<td>7</td>
<td>(64) (2) = 128</td>
</tr>
<tr>
<td>8</td>
<td>(128) (2) = 256</td>
</tr>
<tr>
<td>9</td>
<td>(256) (2) = 512</td>
</tr>
<tr>
<td>10</td>
<td>(512) (2) = 1024</td>
</tr>
</tbody>
</table>
What do you notice about the cancer cells from day 1 to day 10? (They are doubled each day.)

How is this obtained?
(The number of cancer cells in a given day is obtained by multiplying the number of cancer cells present on the preceding day by 2 since the cancer cells double daily.)

If we try to rewrite this product in terms of the number of cancer cells present on the first day, we will have the following table:

**TABLE 2**

<table>
<thead>
<tr>
<th>Day Number</th>
<th>Expression in Terms of the Number of Cells</th>
<th>Number of Cells Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>2 (2)</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>2 (2) (2)</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>2 (2) (2) (2)</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>2 (2) (2) (2) (2)</td>
<td>32</td>
</tr>
<tr>
<td>6</td>
<td>2 (2) (2) (2) (2) (2)</td>
<td>64</td>
</tr>
<tr>
<td>7</td>
<td>2 (2) (2) (2) (2) (2) (2)</td>
<td>128</td>
</tr>
<tr>
<td>8</td>
<td>2 (2) (2) (2) (2) (2) (2) (2) (2) (2)</td>
<td>256</td>
</tr>
<tr>
<td>9</td>
<td>2 (2) (2) (2) (2) (2) (2) (2) (2) (2) (2)</td>
<td>512</td>
</tr>
<tr>
<td>10</td>
<td>2 (2) (2) (2) (2) (2) (2) (2) (2) (2) (2)</td>
<td>1024</td>
</tr>
</tbody>
</table>

Let us focus our attention on the expression that describes the number of cancer cells in a given day in terms of cancer cells present on the first day. This is seen in the second column of table 2.

What can you say about how the expression is written? Why? (It becomes tedious because we write the number repeatedly.)

It is for this reason that in 1637, Rene Descartes, a French mathematician, introduced a system of writing numbers indicating repeated multiplication.

What can you say about Rene Descartes? Do you want to be like him someday? Why? Now, here is another table, let us study this table.

**TABLE 3**

<table>
<thead>
<tr>
<th>Day Number</th>
<th>Expression in Terms of Number of Cells</th>
<th>Number of Cells Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$2^1$</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>$2^2$</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>$2^3$</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>$2^4$</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>$2^5$</td>
<td>32</td>
</tr>
<tr>
<td>6</td>
<td>$2^6$</td>
<td>64</td>
</tr>
<tr>
<td>7</td>
<td>$2^7$</td>
<td>128</td>
</tr>
<tr>
<td>8</td>
<td>$2^8$</td>
<td>256</td>
</tr>
<tr>
<td>9</td>
<td>$2^9$</td>
<td>512</td>
</tr>
<tr>
<td>10</td>
<td>$2^{10}$</td>
<td>1024</td>
</tr>
</tbody>
</table>

In general, if N is the number of days the cancer cells have been present, then the expression for the number of cells present during the n$^{th}$ day is $2^n$. The letter n is called an exponent of base 2.

In $2^2$, what is the exponent? What is the base? In $2^3$, $2^4$? etc. What does the exponent indicate?
(It indicates the number of repeated multiplication.)

- So, what does $2^3$ mean?
  (It means $2 \times 2 \times 2$.)
- How is it read? (“two to the third power” or “two with the exponent three.” Give some more examples.

2. **Fixing Skills**

   Let us have 3 learning stations. Do the activity in each learning station by group. Once you have finished an activity, go to the next station and do the activity indicated there. Do the activities as fast as you can.

**Learning Station 1**

Write the number using an exponent then answer.

1) $7 \times 7 \times 7 =$
2) $8 \times 8 \times 8 \times 8 \times 8 \times 8 =$
3) $6 \times 6 \times 6 \times 6 =$
4) **two to the seventh power**
5) **six with the exponent nine**

**Learning Station 2**

Write the factored form and the answer.

1) $6^3$
2) $3^8$
3) $10^4$
4) $34^2$
5) $7^5$

**Learning Station 3**

Write 2 expressions and the exponent form for each numeral.

<table>
<thead>
<tr>
<th>N</th>
<th>Expression</th>
<th>Exponent Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. 81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. 125</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. 144</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. **Generalization**

The exponent tells the number of times the base is used as a factor. The base is the number used as a factor.

**C. Application**

Based on tables 1, 2, and 3, how many cancer cells have grown on the fifteenth day?

**IV. Evaluation**

A. Complete the following sentences:

1) In $5^3$, _____ is the base and _____ is the exponent.
2) $6^2$ is the exponential form of $6 \times _____$.
3) $144$ is the _____ power of $12$.
4) $2^3$ means $2$ multiplied by _____.
5) $7^4$ means _____ is multiplied by itself four times.

B. Give the value of the following:

1) $6^3 = _____$
2) $9^2 = _____$
V. Assignment
A. Fill in the blanks.
   1) \(9 = 3 \times 3 = 3^2\)
   2) \(16 = \underline{\quad} \times \underline{\quad} = \underline{\quad}^2\)
   3) \(8 = 2 \times 2 \times 2 = 2^3\)
   4) \(10^2 = 10 \times 10 = \underline{\quad}\)
   5) \(10^3 = \underline{\quad} \times \underline{\quad} \times \underline{\quad} = \underline{\quad}\)
B. Complete the pattern.
\[
\begin{array}{cccccccc}
3^1 & 3^2 & 3^3 & 3^4 & 3^5 & 3^6 & 3^7 & 3^8 \\
3 & 9 & 27 & \underline{\quad} & \underline{\quad} & \underline{\quad} & \underline{\quad} & \underline{\quad}
\end{array}
\]

Expressions with Two Different Operations without Exponents and Parenthesis/Grouping Symbols

I. Learning Objectives
Cognitive: Evaluate an expression with two different operations without exponents and parenthesis/grouping symbols
Psychomotor: Write a solution in evaluating an expression
Affective: 1. Be helpful in the family
           2. Be honest

II. Learning Content
Skill: Evaluate an expression with two different operations without exponents and parenthesis/grouping symbols
Reference: Math Textbook
           BEC PELC II A.1.1.3
Materials: flash cards, chart
Value: 1. Being helpful in the family
       2. Being honest

III. Learning Experiences
A. Preparatory Activities
   1. Mental Computation: Drill on Giving the Expression for the Situation
      a. Activity 1 – Game on Numerical Expressions
         Mechanics:
         1) Form 4 groups.
         2) The teacher flashes the situation, (e.g. six multiplied by two, twelve squared). Each group decides within 60 seconds on the corresponding numerical expression for the given situation. One member of each group simultaneously goes to the board and writes the numerical expression.
         3) The teacher together with the class checks the answer.
         4) The group with the highest number of correct answers wins.
b. **Activity 2 – Game on Naming the Word Expression**  
Mechanics:  
1) Form 4 groups.  
2) The teacher flashes numerical expressions, e.g., \(3^2 + 2, (7 - 2)^2\). Each group answers within 60 seconds.  
3) One member of each group simultaneously goes to the board and writes the word expression.  
4) The teacher checks the answer.  
5) The group having the most number of correct answers wins.

2. **Review**

a. **Activity 1**
Direction: Use any of the four fundamental operations in giving the possible equation.

**Example:**  
\(20\)

**Possible Answers:**  
\(20 = 4 \times 5; 20 = 1 \times 20; 2 \times 10 = 20; 40 \div 2 = 20;\)  
\(100 \div 5 = 20; 15 + 5 = 20; 18 + 2 = 20; 17 + 3 = 20;\)  
\(25 - 5 = 20; 200 \div 10 = 20\)

**Mechanics:**  
1) Form 4 groups.  
2) The teacher flashes a card having a 2-digit number.  
3) Each group decides within 60 seconds for their answer.  
4) One member of each group simultaneously goes to the board and writes their answers within 60 seconds.  
5) The group with the most number of correct answers wins.

b. **Activity 2 – Stating the Equation**
Direction: State an equation for a situation.

**Example:**  
In 7 years, Minerva will be 27 years old. How old is she now?  

**Possible Answers:**  
\(N = 27 - 7\)

**Mechanics:**  
1) Form 4 groups.  
2) The teacher flashes the situation.  
3) Each group thinks aloud and decides within 60 seconds for their answers.  
4) The teacher checks the answer.  
5) The group with the most number of correct answers wins.

3. **Motivation**
Ask the pupils about the occupation of their parents. Let them tell how they help their parents earn a living.

B. **Developmental Activities**

1. **Presentation**

   a. **Activity 1 – Use of Role Play in a Sari-Sari Store**
Jethro was helping his mother in their store when a delivery man delivered 20 dozens of eggs at ₱42 a dozen. If the delivery man gave him ₱160, how much was his money? Was he right in asking for a change of ₱260, if his money was ₱1,000? Why?

1) Ask the following questions:
   a) Who helped mother in the store?
   b) Who delivered dozens of eggs?
   c) How many dozens of eggs were delivered to them?
   d) If you were Jethro:
      - will you help your family earn a living? Why?
      - will you keep the change given by the delivery man? Why?

2) Have each pair of pupils act it out using play money and ask them to answer the following:
   a) What are the given data?
   b) What are the operations to be used?

3) Lead each pair of pupils to think of an expression related to the problem.

4) Let them evaluate the expression they have formulated.
   
   \[ 160 + (20 \times 42) \]
   
   \[ 160 + 840 \]
   
   \[ 1,000 \text{ money of Jethro} \]

5) Require them to analyze the operations they used in arriving at the exact change.

b. Activity 2 – Use of Counters in Evaluating Expressions

Sample:

A 5-item test is equivalent to 10 points if each item receives 2 points. Dangdang says she missed 1 point in the test. Was Dangdang correct?

1) Ask the following questions:
   a) Who is the pupil in the problem?
   b) How many items does the test have?
   c) How many points is each item?
   d) If you were Dangdang will you also study hard? Why? Can you help your family if you study hard? Why?

2) Have each pair of pupils use counters to visualize the problem. Let them answer the following questions.
   a) What facts are given?
   b) What are the processes to be used?

3) Guide each pair of pupils to think of an expression in relation to the problem.

4) Let them think: Can Dangdang be wrong? Ask them to evaluate the expression.
   
   \[ 10 - 2 \times 4 \]
   
   \[ 10 - 8 \]
   
   \[ 2 \]

5) Require each pair of pupils to analyze the operations they used in arriving at the missed points.

c. Activity 3 – Use of Test Items

Tita was absent for a week because she was sick. When she went to school, she had to take a test. Few of the items given are shown below.
1. Practice Exercises/Fixing Skills
Evaluate the expression.

   a) \( 8 + 4 \div 2 \)
   b) \( 5 \times 8 \div 4 \)
   c) \( 65 - 91 \div 7 \)
   d) \( 72 \div 3 \times 8 \)
   e) \( 67 + 33 \div 25 \)

2. Generalization
Expected Question: How do we evaluate an expression with two different operations without exponents and parenthesis/grouping symbols?

C. Application
Write an expression about the problems. Then evaluate the expression.
1) In a certain eatery, there are 5 glass racks having 24 glasses and 8 left over. The answer says there are 130 glasses in all. Is it right? Why?
2) Use numbers less than 7 once to make the expression right.
   \[ \square \times \square - \square \]
   \[ \square - \square \]
   \[ 27 \]
3) Write the operation in the box to make the expression right.
   \[ 81 \square 9 \square 7 \]
   \[ 81 \square 63 \]
   \[ 18 \]

IV. Evaluation
Evaluate the following expressions.
1) \( 4 \times 3 + 8 \)
2) \( 84 \div 3 \times 4 \)
3) \( 76 - 8 + 5 \)
4) \( 53 + 7 - 20 \)
5) \( 3 \times 5 \div 25 \)
6) \( 7 \times 8 + 130 \)
7) \( 195 \div 3 \times 5 \)
8) \( 3 \times 83 - 73 \)
9) \( 76 - 8 \times 9 \)
10) \( 90 \times 5 \div 75 \)
Evaluate the expressions if \( L \) is equal to 2.

11) \( 35 + 7L \)
12) \( 108 \)
\( 6L \)

Write the operations to make the expression right.

13) \[
\begin{array}{ccc}
60 & \square & 42 & \square & 14 \\
60 & \square & 3 & \\
57 & \\
\end{array}
\]
14) \[
\begin{array}{ccc}
16 & \square & 8 & \square & 4 \\
16 & \square & 2 & \\
8 & \\
\end{array}
\]

15) Write an expression for the problem, then evaluate.

Tickets for children in a carnival cost \( \text{P}150 \). A teacher of a class of 48 pupils gets for the whole class but only 43 pupils buy. Is it right for the teacher to say that she has \( \text{P}6,350 \) for the tickets of the children? Why?

V. Assignment

1. Evaluate the following expressions.

   a) \( 8 \times 15 - 9 \)
   b) \( 44 + 56 \div 7 \)
   c) \( 67 + 3 \times 9 \)
   d) \( 27 - 8 \div 4 \)
   e) \( 3 \times 8 \div 6 \)

2. Write a problem. Make an expression about it. Then evaluate.

Expressions with More Than Two Operations with Exponent and Parenthesis/Grouping Symbols

I. Learning Objectives

Cognitive: Evaluate an expression with more than 2 operations with exponents and parenthesis/grouping symbols

Psychomotor: Write the solution in evaluating the expression

Affective:
   1. Be clean and orderly
   2. Be helpful

II. Learning Content

Skill: Evaluating an expression with more than 2 operations with exponents and parenthesis/grouping symbols

Reference: BEC PELC II.A.1.1.4
Math Textbooks

Materials: flash cards, charts

Values:
   1. Being clean and orderly
   2. Being helpful
III. Learning Experiences

A. Preparatory Activities

1. Drill
   a. Activity 1 – Evaluating the Expression
      Materials: flash cards
      Mechanics:
      1) Form 4 groups of pupils.
      2) The teacher flashes the cards with expressions.
      3) The groups are given 60 seconds to evaluate the expression.
      4) One member of each group simultaneously goes to the board and writes the
         answer.
      5) The teacher checks the answer.
      6) The group with the most number of correct answers wins.
         Sample item:
         a) \(3 \times 4 + 1 =\)  c) \((6 + 3) + 2 =\)
         b) \(62 + 3 =\)  d) \((16 \div 4) \times 3 =\)
   
   b. Activity 2 – Completing the Evaluation
      Materials: numbered rolled papers \((1, 2, 3, 4)\)
      8 \(\frac{1}{8}\) sheets of manila paper with incomplete evaluation of
      expression
      Example:
      a) \(7 + 3 \times 4\)  b) \(7^3 - (8 - 5)^3\)
         \[
         \begin{array}{ll}
         7 + & \square \\
         \square & \square \cdot \square \\
         \square & \square \cdot \square \\
         \end{array}
         \]
         \(334\)
      Mechanics:
      a) Form 4 groups. Each leader of the group draws a numbered rolled paper.
      b) The leader who has drawn number 1 is the first to get 2 sheets of manila
         paper followed by the 2\(^{nd}\), 3\(^{rd}\), and 4\(^{th}\).
      c) The group is given 2 minutes to complete the evaluation of the expression
         on the manila paper.
      d) The group claps to signify that they are through and have posted their output
         on the board.
      e) The teacher together with the class process the answer.
      f) The group having the highest points wins.

2. Motivation
   What do you observe when somebody in your home is sick? Does he take
   medicine? Is it liquid or tablets? How are tablets kept?

B. Developmental Activities

1. Presentation

   a. Activity 1 – Use of Flats and Longs
      Sample:
      In a certain drugstore, the pharmacist daughter of the owner helps her
      mother account the medicines for fever. She finds specialized square holders
      of tablets. She has recorded 4 groups of 10 layers of 10 tablets on each side of the
      holders and 6 sets of 10 tablets. Is she right in reporting that there are 40 060
      tablets? Why?
1) Ask the pairs of pupils the questions below:
   a) What is the profession of the daughter of the drugstore owner?
   b) What does the pharmacist do?
   c) What does she find?
   d) If you were the pharmacist, will you also have a systematic arrangement of your medicines? Why?
2) Have each pair of pupils use flats and longs to visualize the problem. Let them answer the following questions:
   a) What will you find in the problem?
   b) What are the data given?
   c) What are the operations to be used?
3) Lead each pair of pupils to think aloud of a numerical expression about the problem.
   \[(4 \times 10^3) + (6 \times 10)\]
4) Ask them to decide on: Is she right in reporting that they have 40 060 tablets? Why? Have them evaluate the expression as in:
   \[(4 \times 10^3) + (6 \times 10)\]
   \[4000 + 60\]
   \[4060\]
5) Draw from the pairs of pupils through analysis which operation should be done first, second, next, and last. Include also in the analysis the meaning of parenthesis in the expression and the direction it gives when evaluating the expression.

b. Activity 2 – Use of Illustration
   Sample:
   Emma helps her mother arrange the items in their store. Her mother has specialized square tray for quail eggs. She finds 4 groups of 5 rows with 5 quail eggs placed in trays and 3 groups with 10 quail eggs. She informs her mother that they have 1 030 quail eggs. Is she right? Why?
   1) Have the pairs of pupils answer the following questions:
      a) Who helps her mother in the store?
      b) What does Emma do to help her mother?
      c) If you were Emma will you also arrange the items for sale in the store of your mother? Why?
   2) Ask each pair of pupils the questions below. Use these illustrations.
a) What facts are given?
b) What are the processes to be used?

3) Guide them to think aloud of the numerical expression that can best represent the problem.
4) Let them think critically: Is Emma right? Why?
5) Ask them to evaluate the numerical expression.
   \[(4 \times 5^2) + (3 \times 10)\]
   \[(4 \times 25) + (3 \times 10)\]
   \[100 + 30\]
   \[130\]
6) Have the pairs of pupils analyze which operation should be used first, second, next, and last to arrive at the answer.

c. Activity 3
Bing asks her son to do his homework and looks at his notebook. She finds the following:
Evaluate the expressions:
   1) \(6 + (2 \times 7 + 5^2)\)
   2) \(3 \times (4 \times 8^2) - 8\)
   3) \(5 \times [24 \div 2 \times (10 - 8) \div 10]\)
   4) \((15 - 6) + (4 - 1) \times 2^3\)
   5) \(3 \times [3 + 2 \times (10 - 32)]\)
a) Ask each pair of pupils to answer the questions below:
   1) What are the facts given?
   2) Which operation should be done first? second? third? last? Why?
b) Have each pair of pupils evaluate the expressions.
   1) \(6 \times (2 \times 7 + 5^2)\)
   2) \(3 \times [(4 \times 8^2) \div 8]\)
   3) \(5 \times [32 \div 2 \times (10 - 8)^2] \div 10\)
   4) \((15 - 6) + (4 - 1) \times 2^3\)
   5) \(3 \times [3 + 2 \times (10 - 32)]\)
c) Lead the pairs of pupils process how to arrive at the answer.

2. Practice Exercises/Fixing Skills
a) \((114 - 4) \times (12 \div 4)^2 + 3\)
   d) \(122 \times 30 + (890 \div 2)\)
b) \(16 + 82 \div (4 + 4)\)
   e) \(6^2 \times 23 + (400 \div 2)\)
c) \((36 - 6) \times (3 \times 4)^2 + 7\)

3. Generalization
   How do we evaluate an expression with more than two operations with exponents and parenthesis/grouping symbols?

C. Application
   1) Write an expression about the problem. Then evaluate.
Rolly helps his father arrange the baked cheese cakes placed in a specialized square box. He has arranged 5 groups of 8 cheese cakes on each side and 3 sets of 7 cheese cakes in a tray in a display cabinet.

2) Write the operation in the box to make the subsequent expressions right.
(42 □ 7) □ 32 □ 7
35 □ 32 □ 7
3 □ 7
10

3) Insert a parenthesis/grouping symbols to make the expression correct.
3 x 42 + 9 ÷ 15 = 9

IV. Evaluation

1. Evaluate the following expressions:
   a) (9 − 2) + (3² x 21)
   b) (18 + 14) ÷ (6 + 2)
   c) 36 ÷ 22 + 4 x (4 − 2)
   d) (36 − 6) + [(3 x 42) ÷ 7]
   e) (72 + 15) x 4 − (625 ÷ 125)
   f) 4 x (15 − 32) + 16
   g) (93 + 7) x 6 + 10
   h) 12 x 30 + (890 ÷ 10)
   i) [(144 ÷ 12) x 3] ÷ 3 x 6
   j) (16 + 82) ÷ (4 + 4)

2. Evaluate the expression if:
   a) R = 2
      \[[(6^R + R x 8) ÷ 13] − 5 + R\]
   b) S = 3
      \[[(7^S − S) x 6] + 6^S − S x 5\]

V. Assignment

1. Evaluate the following expressions:
   a) (34 − 4) x (75 ÷ 5²)
   b) (35 − 3) x 32 + 9
   c) (38 − 7) + 6 ÷ (2 x 3)

2. Insert an operation symbol and parenthesis to make a whole number that is the:
   a) highest possible answer
   b) least possible answer
   \[2^2 □ 3 □ 4 □ 6\]

Expressions with More Than Two Operations without Exponents and Parenthesis/Grouping Symbols

I. Learning Objectives

Cognitive: Evaluate an expression with more than 2 operations without exponents and parenthesis/grouping symbols
Psychomotor: Write the evaluation of an expression
Affective: Help parents at home
Internalize honesty in one’s life

II. Learning Content

Skill: Evaluating an expression with more than 2 operations without exponents and parenthesis/grouping symbols
Reference: BEC PELC II A.1.1.4
Materials: flash cards, charts, play money, counters
Values: Helpfulness
Honesty

III. Learning Experiences

A. Preparatory Activities

1. Drill/Review: Evaluating Expressions with 2 Different Operations without Exponents and Parenthesis/Grouping Symbols

   a) Activity 1 – “Winner Takes All”
      Materials: flash cards with expressions
      Mechanics:
      1) Form 4 groups.
      2) The teacher flashes the cards.
      3) The groups of pupils are given 60 seconds to evaluate the given expression.
      4) A member of each group simultaneously goes to the board and writes the answer.
      5) The teacher checks the answer.
      6) The group with the highest number of correct answers wins the prize.
      Note: Unused flash cards with expressions will be used in peer teaching.

   b) Activity 2 – Role Play: Teacher
      Materials:
      Mechanics:
      1) Form 4 groups.
      2) The leader of each group draws the numbered rolled paper and the group having number 1 gives the first expression to the class. The members of the group giving the expression should know its evaluation.
      3) The other groups are given 60 seconds to evaluate.
      4) A member of the other 3 groups simultaneously goes to the board and writes the answer.
      5) The teacher checks the answer.
      6) The group with the most number of correct answers wins.
2. Motivation

Have you ever been to the market? What do you see in the market?

B. Developmental Activities

1. Presentation

a. Activity 1 – Role Play

Sample:

Reynaldo helps his mother in marketing. His mother gives him ₱300 to buy 4 kilograms of fish at ₱86 a kilo. Along the way he meets his father who gives him a 200-peso bill for the items he has to buy. When he goes home, he says that he has a change of ₱176. Is he telling the truth? Why?

1) Ask the pairs of pupils the questions below:
   a) Who helps mother?
   b) How does he help his mother?
   c) What does mother ask him to do?
   d) How much did mother give him?
   e) How much did father give him?
   f) How much change does he have?
   g) If you were Reynaldo will you be:
      ● helping your mother? Why?
      ● honest? Why?

2) Have them use play money in their role playing. Let each pair of pupils look for:
   a) what to find in the problem
   b) the given data
   c) the operations to be used

3) Guide each pair of pupils to think aloud of a numerical expression that can best represent the problem.
   ₱300 + ₱200 – 4 × ₱86
   ₱300 + ₱200 – ₱344
   ₱500 – ₱344
   ₱156

4) Draw from the pairs of pupils which process should be done first, next, and last. Include also the direction or rules they have used in evaluating the expression.

b. Activity 2 – Use of Counters in Acting Out

Sample:

Luisa, a dressmaker, had 4 boxes having 15 beads each and 8 more. She lost 9 beads when she left the box open and accidentally spilled it. Her youngest daughter helped her look for the rest but failed to find them. Her husband who came from the office brought 25 beads for her. After a while she said, she had 108 beads. Is she right? Why?

1) Have the pairs of pupils answer the following questions:
a) Who is the dressmaker?
b) What does she have?
c) Why has she lost some beads?
d) Who helps her look for the lost beads?
e) If you were the youngest daughter will you also help your mother? Why?

2) Let each pair of pupils use counters in acting out and visualizing the problem. Have them point out the following:
a) What to find in the problem?
b) What are the given facts?
c) What operations are to be used?

3) Lead each pair of pupils to think aloud of a numerical expression that can best represent the problem.

4) Have them think critically.

5) Require the pairs of pupils to analyze which operation should be done first, second, next, and last to get to the answer.

6) Ask them to evaluate the numerical expression.

\[
\begin{align*}
4 \times 15 + 8 & - 9 + 25 \\
60 + 8 & - 9 + 25 \\
68 - 9 & + 25 \\
59 + 25 & \\
84 & \\
\end{align*}
\]

c. Activity 3

Lulu comes from school with a heavy heart because of homework. Her elder brother gives her a helping hand. He has seen the following:

Evaluate the expressions:

a) \(12 - 3 + 18 \div 6 \times 3\)
b) \(7 \times 9 - 3 + 8\)
c) \(18 - 12 \div 6 + 7\)
d) \(9 \times 9 \div 3 - 9 + 6\)
e) \(16 \div 4 \times 5 - 7 + 8\)

1) Ask each pair of pupils to answer the questions below:
a) What are the given data?
b) What operations must be done first? second? next? last? Why?

2) Have each pair of pupils evaluate the expressions.

a) \(12 - 3 + 18 \div 6 \times 3\)  b) \(7 \times 9 - 3 + 8\)  c) \(18 - 12 \div 6 + 7\)
\[
\begin{align*}
12 - 3 & + 18 \div 6 \times 3 \\
12 - 3 & + 9 \\
9 & + 9 \\
18 & \\
12 - 3 + 9 & \\
60 & + 8 \\
6 & + 7 \\
18 & \\
9 & + 9 \\
68 & \\
8 & \\
\end{align*}
\]

d) \(9 \times 9 \div 3 - 9 + 6\)  e) \(16 \div 4 \times 5 - 7 + 8\)
\[
\begin{align*}
9 \times 9 & \div 3 - 9 + 6 \\
81 & \div 3 - 9 + 6 \\
27 & - 9 + 6 \\
18 & + 6 \\
24 & \\
16 & \div 4 \times 5 - 7 + 8 \\
4 \times 5 & - 7 + 8 \\
20 & - 7 + 8 \\
13 & + 8 \\
21 & \\
\end{align*}
\]

3) Lead the pairs of pupils to process how to get the answer.
2. Practice Exercises/Fixing Skills
   a) $1200 \div 200 \times 4 - 8 + 9$
   b) $60 + 48 \div 2 \times 4$
   c) $12 + 19 \times 16 \div 4 - 7$
   d) $35 \div 5 \times 8 - 7 + 9$
   e) $6 \times 24 - 48 \div 12 + 75$

3. Generalization
   How do we evaluate an expression with more than two operations without exponents and parenthesis/grouping symbols?

C. Application
   1) Write an expression about the problem. Then evaluate.

   Manuel has 6 boxes of chalk having 100 pieces each and 7 boxes of colored chalk having 20 pieces each. He shared equally the colored chalk among his 4 friends. He says that he has 3 210 pieces of chalk. Is he correct? Show your solution?

   2) Insert the appropriate operation to make the expression correct.

   $72 \Box 8 \Box 5 \Box 6 \Box 9$

   3) Use the digits 5, 6, 7, and 8 to make the expression result to 39.

   $\Box \times \Box - \Box + \Box$

   Answer: 39

IV. Evaluation

A. Evaluate the following expressions:

   1) $2 \times 70 - 9 \div 3 + 8$
   2) $60 + 48 \div 2 \times 5$
   3) $4 \times 15 \div 5 + 6 - 4$
   4) $7 \times 9 \div 3 - 7 + 8$
   5) $6 \times 4 + 7 - 8 \div 2$
   6) $90 \div 9 \times 2 - 3 + 8$
   7) $12 \times 9 \div 6 - 3 + 8$
   8) $7 - 3 + 45 \div 3 \times 5$
   9) $3 \times 8 + 5 - 2 \times 3$
   10) $9 \div 3 \times 7 - 6 + 8$

B. Evaluate the expression if:
   1) $D = 3$
      $D \times 9 - D \div D + 7$
   2) $T = 4$
      $96 \div T \times 6 - D + 9$

C. Write an expression for the problem. Then evaluate the expression.

   Sixto had 90 leaves of pad paper. He sold 68 leaves to his classmate. When he went home, his father bought four 90 leaves of pad paper. He was very happy and said, I have 112 leaves of pad paper. Was he right? Why?

V. Assignment

1. Evaluate the following expressions:
   a) $18 + 24 \div 9 \times 12$
   b) $15 + 9 \times 8 - 7$
   c) $9 \div 3 \times 25 - 5 + 8$
2. Insert the operation in the box to make a whole number that is:
   a) highest possible answer
   b) least possible answer

5 6 7 8 9

3. Write a problem. Write the expression about it and evaluate.

Expressions with More Than Two Operations with or without Exponents and Parenthesis/Grouping Symbols

I. Learning Objectives

Cognitive: Evaluate an expression with more than two operations with or without exponents and parenthesis/grouping symbols
Psychomotor: Work in teams
Affective: Practice honesty in doing one’s work

II. Learning Concepts

Skill: Evaluating an expression with more than two operations with or without exponents and parenthesis/grouping symbols
Reference: BEC PELC II. A.1.1.4
Materials: charts, flash cards, cross number puzzles
Values: Cooperation, honesty

III. Learning Experiences

A. Preparatory Activities

1. Review
   a) Place parenthesis in the equation so that each equation will be a true statement. Work in pairs.
   1) 16 – 7 + 8 = 1
   2) 3 × 5 – 4 = 3
   3) 18 ÷ 6 × 3 = 1
   4) 16 – 7 + 8 = 17
   5) 12 ÷ 2 + 4 = 2

   b) Use the numbers 3, 4, 6, and 8 once in each exercise to make a true statement.

   (____ x _____) ÷ (____ + _____) = 2
   _____ x _____ ÷ (_____ x _____) = 1
   _____ x (_____ x _____) ÷ _____ = 18
   _____ ÷ (_____ - _____) + _____ = 14

2. Motivation

   Do you like to go hunting? Let’s have a word hunting game. Encircle the words diagonally, horizontally, or vertically.
B. Developmental Activities

1. Presentation

a. Study the rules in the order of operations.

1) Perform the operations within each pair of grouping symbols (parenthesis, brackets, and braces) beginning with the innermost pair.
2) Simplify the expression with exponents.
3) Perform multiplication and division as they occur from left to right.
4) Perform addition and subtraction as they occur from left to right.

Example 1

Simplify: \[ \frac{12}{6} \times 2 + 4 - 5 \]

\[ 2 \times 2 + 4 - 5 \quad \text{Rule 3} \]

\[ 4 + 4 - 5 \quad \text{Rule 3} \]

\[ 8 - 5 \quad \text{Rule 4} \]

\[ 3 \]

Example 2

Simplify: \[ 6^2 \div 3 \times 2 + 5 - 1 \]

\[ 36 \div 3 \times 2 + 5 - 1 \quad \text{Rule 2} \]

\[ 12 \times 2 + 5 - 1 \quad \text{Rule 3} \]

\[ 24 + 5 - 1 \quad \text{Rule 3} \]

\[ 29 - 1 \quad \text{Rule 4} \]

\[ 28 \]
Example 3:
Simplify: \[ 3 \times [ 4 - 2 \times (10 - 8) + 12 \div 6 \times 1 ] \]
\[ 3 \times [ 4 - 2 \times 2 + 12 \div 6 \times 1 ] \quad \text{Rule 1} \]
\[ 3 \times [ 4 - 4 + 12 \div 6 \times 1 ] \quad \text{Rule 3} \]
\[ 3 \times [ 4 - 4 + 2 \times 1 ] \quad \text{Rule 3} \]
\[ 3 \times [ 4 - 4 + 2 ] \quad \text{Rule 4} \]
\[ 3 \times [ 0 + 2 ] \quad \text{Rule 1} \]
\[ 3 \times 2 \]
\[ 6 \]

b. Ask:

1) What rules did we follow in example 1? What did we do with the exponent in example 2? What did we do with the parenthesis? Which expression inside the parenthesis should be done first? What other symbols are used in grouping expressions?
2) What are the rules for the order of operation when parenthesis, exponent, addition, subtraction, multiplication, and division are involved?
3) What should you remember in answering exercises in mathematics? What character traits does it require? (patience and perseverance)

2. Fixing Skills

a. Activity 1

Simplify the expressions below and solve.
1) \( 32 \div 2 \times 2^2 \)
2) \( 6 \div 2 + 1 \times 4 \)
3) \( (15 - 6) + (4 - 1) \times 23 \)
4) \( 3 \times \left[ 3 + 2 \times (10 - 3) \right] \)
5) \( 12 + 3 \times \left[ 3 \times \left( 4 + (9 - 8) - 2 \right) - 3 \right] \)

Find a partner and discuss your solutions with each other.

b. Activity 2

Simplify each expression and complete the cross number puzzle.

<table>
<thead>
<tr>
<th>Across</th>
<th>Down</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ((7 \times 9) + (3 \times 21)) =</td>
<td>a. (16 \times (15 - 5)) =</td>
</tr>
</tbody>
</table>
| b. \((18 - 15) + 6 + 2\) = | b. \(4 \times (15 - 3) + 16 = \)
| c. \((3 + 5) \times (42 \div 7)\) = | c. \((19 - 7) \times (4 + 8) + 8\) = |
| d. \((36 \div 2 + 4 \times 4 - 2)\) = | d. \((12 \times 30) + (890 \div 2)\) = |
| e. \((i. \(35 - 3) \times 3 + 9\) = | e. \((93 + 7) \times 6 + 10\) = |
| f. \((j. \(72 + (8 + 2) \times 6\) = | f. \(12 + 25 \div 5 \times 3 + 300\) = |
| g. \((k. \(34 - 4) \times (70 \div 10)\) = | g. \(1.12 \div 2 \times 3 + 15\) = |
| h. \((l. \(72 \div (8 + 2) \times 6\) = | h. \(12 + 25 \div 5 \times 3 + 300\) = |
| i. \(n. \(5 \div (4 \times 9) - 4\) = | i. \(l. \((42 - 3) \times 3 + 7\) = |
| j. \(o. \(30 \times 7 + (264 \div 8)\) = | j. \(m. \(23 + 400 \div 2\) = |
| k. \(p. \(36 \div (2 + 4) \times 4 - 5\) = | k. \(n. \((114 - 4) \times (12 \div 4) + 3\) = |
| l. \(q. \((72 + 15) \times 4 + (625 \div 5)\) = | l. \(p. \(16 + 8 \div (4 + 4)\) = |
| m. \(r. \((36 - 6) \times (3 \times 4) + 7\) = | m. \(q. \((72 + 15) \times 4 + (625 \div 5)\) = |

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3. **Generalization**
   What rule would you follow in evaluating expressions with more than two operations? State the rule.

C. **Application**
   Draw a diagram/figure for the problem, write an equation and then solve.
   The length of a rectangle is 3 metres more than its width. If the perimeter is 54 metres, what are its dimensions?

IV. **Evaluation**
   Simplify and solve.
   1) \(63 ÷ 7 + 5 + 2^2 − 6 + 3\)  
   2) \(6 + (2 × 7 + 5^2)\)  
   3) \(3 × (4 + 8^2) − 8\)  
   4) \(37 + 3 × 2 ÷ 6\)  
   5) \(14 ÷ 2 − 3 + 2 × 2\)

V. **Assignment**
   Answer the following questions:
   1) \(10^{17}\) is one followed by how many zeros?  
   2) Find \((x^2)^2\) if \(x = 3\)  
   3) If your calculator does not have an exponent key, can you use the definition of an exponent in \(2^3 + 3\)? How? Ans. \(2 × 2 × 2 + 3\)

**Order of Operations in Solving 2- to 3-Step Word Problems**

I. **Learning Objectives**
   **Cognitive:**
   1. Solve 2- to 3- step word problems involving whole numbers
   2. Apply the order of operations in solving 2- to 3-step word problems
   3. Give/state the answer in a complete sentence with proper units/label
   **Psychomotor:**
   Write an equation to solve multi-step word problems
   **Affective:**
   Show cooperation when working in teams
II. Learning Concept

Skill: Applying the order of operations in solving 2- to 3-step word problems
Reference: BEC PELC II. A.1.2, 1.2.1, 1.2.2, 1.3
Materials: drill board, chart
Value: Cooperation

III. Learning Experiences

A. Preparatory Activities

1. Drill
   Perform the indicated operations.
   a) \((12 + 3) - 7 = N\)
   b) \(4 (6 + 8) = N\)
   c) \(25 ÷ 5 + 9 = N\)
   d) \((18 - 4) (5 + 3) = N\)
   e) \((6 ÷ 3) + 10 x 3) = N\)

2. Review
   Work in groups.
   There are no numbers given in the following problems. Tell which operation/s would you use to solve each problem.
   a) The boy scouts hiked _____km. Then they hiked _____ km more. How far did they hike?
   b) After gaining _____kg, Rico weighed _____kg. What was his former weight?
   c) How many pupils should be accommodated equally in _____ shuttle buses if there are _____ pupils?
   d) _____ hectares of land are planted with rice. _____ cavans of rice can be harvested per hectare. How many cavans in all can be harvested?
   e) There were _____ hamburgers in each box. When I counted the hamburgers, there were _____ in all. How many boxes of hamburgers were there?

3. Motivation
   What would you like to be when you grow up? Who wants to be a businessman/businesswoman? What do you need to establish a business? (Unlock the meaning of capital and merchandise.)

B. Developmental Activities

1. Presentation
   Read and study the problem below.
   Problem A
   Mr. Gonzales put up a capital coming from the following:
   Bank – ₱250,000.00
   Private Loan – ₱100,000.00
   Personal Money – ₱150,000.00
   The cost of the merchandise he bought was ₱365,273.00. How much was left from his capital?
   Ask: Where did Mr. Gonzales get his capital? How much was the merchandise he bought? What can you say about Mr. Gonzales? Why do you say so? Let us analyze the problem.
   - What is asked?
   - What facts are given?
   - What is the hidden question?
   - What operations are needed?
   - What is the number sentence?
Problem B
Ana bought 2 kg of ripe papayas at P65.00 per kg and a kg of banana at P76.00 per kg. How much change did she receive from a P500.00 bill? Let’s analyze.

- What is asked?
- What facts are given?
- What is the hidden question?
- What operations are needed?
- What is the number sentence?
- What is the solution to the problem?
- Does the answer make sense?

2. Fixing Skills
Working by station
a) Group pupils into 4.
b) Assign each group their base then solve/do what is asked of them in each base.
c) After 5 minutes, each group will transfer to the next base until all groups have reached all the bases.
d) Each group will then present their work to the whole class.
Write the mathematical sentences and solve.
BASE 1
Juan bought a pair of shoes costing P925.00 and a tie costing P275.00. He gave the seller P2,000.00. How much change did he receive?
BASE 2
There are 834 pupils in San Isidro Elementary School and 675 pupils in Sta. Ana Elementary School. Eight hundred pupils from these two schools are girls. How many are boys?
BASE 3
Five friends decided to share the expenses for their picnic. They bought 2 kg of shrimp at P425.00 per kg, a fried chicken at P225.00, and fruits for P400.00. How much was each person's share for the picnic?
BASE 4
Mr. Cruz received P18,550.00 last month. He spent P3,000.00 for food, P1,500.00 for electricity, P300.00 for the water bill, P1,050.00 for transportation, and P726.00 for miscellaneous expenses. The rest of his money was divided equally among his 5 sisters. How much did each sister receive?

3. Generalization
What are the steps to follow in solving 2- to 3-step word problems? What is the first thing you need to know? Why?

C. Application
Analyze and solve the problem below.
A movie earned P5,470,551.00 in 27 theatres in Manila and P2,005,924.00 in 61 movie houses in other parts of the country. Combining the two amounts, what was the average income per theatre from this movie?

IV. Evaluation
Read the problem below and do what is asked.
Girl scout troop no. 131 collected 150 kg of rice on the first week and 110 kg on the second week. Troop no. 250 collected 98 kg and 100 kg on the first and second weeks, respectively. If the rice they collected will be distributed equally among 20 families of Mahabang Parang and 23 families of Sitio Pinagpala, how many kg should each family receive?
Analyze and solve.

Mr. Cruz had ₱4,500.00. He spent ₱2,500.00 for food; ₱750.00 for transportation, and ₱275.00 for other expenses and divided the rest among his 5 brothers. How much was the share of each?

1. What is asked
2. Hidden question 1
3. Hidden question 2
4. Step 1
5. Step 2
6. Step 3
7. Number sentence
8. Solution
9. Answer with the correct unit
10. Check if your answer makes sense