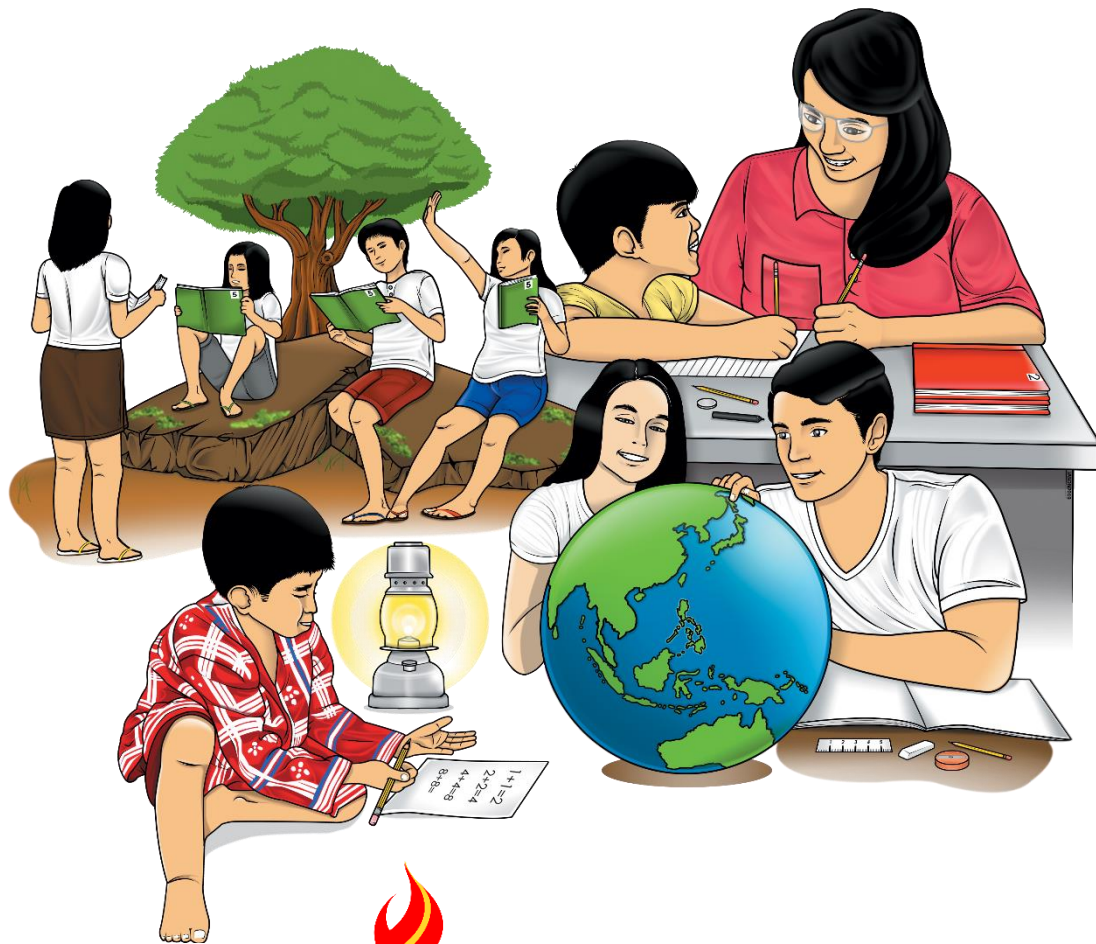


# Mathematics

## Quarter 2 – Module 6: Understanding Numbers Expressed in Exponential Notation



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**Mathematics– Grade 6**  
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**Quarter 2 – Module 6: Understanding Numbers Expressed in Exponential Notation**  
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# 6

# **Mathematics**

## **Quarter 2 – Module 6:**

### **Understanding Numbers**

### **Expressed in Exponential**

### **Notation**



## ***What I Need to Know***

This module was designed and written with you in mind. It is here to help you master the skills in expressing numbers in exponential notation. The scope of this module permits it to be used in many different learning situations. The language used recognizes your diverse vocabulary level. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module is divided into two lessons, namely:

- Lesson 1 – Describing the Exponent and the Base in a Number Expressed in Exponential Notation
- Lesson 2 – Giving the Value of Numbers Expressed in Exponential Notation

After going through this module, you are expected to:

1. identify the exponent and the base in a number expressed in exponential notation;
2. describe the exponent and the base in a number expressed in exponential notation **(M6NS-IIf-146)**; and
3. give the value of numbers expressed in exponential notation. **(M6NS-IIf-147)**.



## What I Know

Read each item carefully. Then choose the letter of the correct answer. Write the answers on your answer sheet.

- In  $17^6$ , the number 17 is called \_\_\_\_\_.  
A. base                      B. exponent                      C. power                      D. notation
- The number that indicates how many times the base is used as a factor in an exponential notation is known as \_\_\_\_\_.  
A. base                      B. exponent                      C. notation                      D. exponential
- Which is the shorter way of writing  $55 \times 55 \times 55 \times 55 \times 55 \times 55$ ?  
A.  $5^5$                       B.  $5^6$                       C.  $6^{55}$                       D.  $55^6$
- The correct way of reading the exponential notation  $45^5$  is \_\_\_\_\_.  
A. 5 to the power of 45                      C. 45 to the power of 5  
B. 5 to the 45<sup>th</sup> power                      D. 45 to the 55<sup>th</sup> power
- How will the repeated multiplication  $14 \times 14 \times 14 \times 14 \times 14 \times 14 \times 14$  be expressed in exponential notation?  
A.  $14^7$                       B.  $7^{14}$                       C.  $14^6$                       D.  $6^{14}$
- Which of the following statements describes the difference between  $7^{11}$  and  $11^7$ ?  
A. In  $7^{11}$ , 11 is the base and 7 is the exponent while in  $11^7$ , 7 is the base and 11 is the exponent.  
B. In  $7^{11}$ , 11 is the exponent and 7 is the base while in  $11^7$ , 7 is the base and 11 is the exponent.  
C. In  $7^{11}$ , 7 is used as a factor 11 times while in  $11^7$ , 11 is used as a factor 7 times.  
D. In  $7^{11}$ , 11 is used as a factor 7 times while in  $11^7$ , 7 is used as a factor 11 times.
- What will be the exponent when the repeated multiplication  $87 \times 87 \times 87 \times 87 \times 87$  be expressed in exponential notation?  
A. 8                      B. 7                      C. 6                      D. 5
- What is meant by the exponential notation  $115^3$ ?  
A. 115 as the exponent will be multiplied by 3  
B. 115 as the base will be used as a factor 3 times  
C. 3 as the exponent will be multiplied by 115  
D. 3 as the base will be used as a factor 115 times
- Which of the following statements is TRUE?  
A. In  $300^4$ , number 4 is the base and 300 is the exponent.  
B. The exponential notation  $300^4$  has a base of 30 and exponent of 4.  
C. In  $300^4$ , 4 will be used as a factor 300 times.  
D. The exponential notation  $300^4$  means  $300 \times 300 \times 300 \times 300$ .
- Dina is holding a card with the repeated multiplication as shown below.

$39 \times 39 \times 39 \times 39 \times 39 \times 39 \times 39 \times 39 \times 39 \times 39$
--

Which is the equivalent exponential notation for it?

- A.  $39^7$                       B.  $39^8$                       C.  $39^9$                       D.  $39^{10}$

## Lesson

# 1

# Describing the Exponent and the Base in a Number Expressed in Exponential Notation

In your previous grade, you have learned multiplying a number by itself several times. This process can be expressed in a shorthand way and this is what you will learn in this lesson.



## *What's In*

Find each product. Write the answers on your answer sheet.

1)  $3 \times 3 \times 3 \times 3 =$

2)  $7 \times 7 \times 7 =$

3)  $2 \times 2 \times 2 \times 2 \times 2 \times 2 =$

4)  $9 \times 9 =$

5)  $4 \times 4 \times 4 \times 4 \times 4 =$



## *What's New*

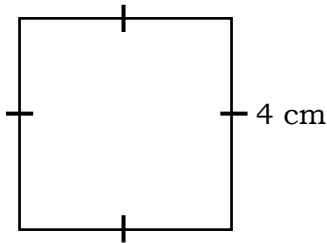
Do you know how to square a number? How important do you think is acquiring this skill?

Let's work on the following problem to find out.

Each side of a square is 4 centimeters long. Find the area of the square.



## What is It



To find the area of the square:

$$\begin{aligned}\text{Area of the square} &= \text{side} \times \text{side} \\ &= 4 \text{ cm} \times 4 \text{ cm} \\ &= 16 \text{ cm}^2\end{aligned}$$

We can write  $4 \times 4$  as  $4^2$ .

$$\begin{array}{c} \text{base} \longrightarrow 4^2 \longleftarrow \text{exponent} \end{array}$$

4 is called the **base**, which is the number used as a factor.

2 is called the **exponent**, which says how many times the base is used as a factor.

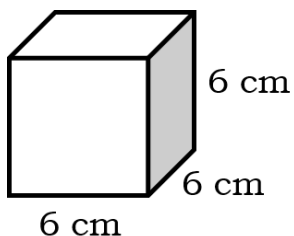
$4^2$  is an example of a number written in **exponential notation**.

We use exponential notation as a shorter way of writing repeated multiplication.

$4^2$  is read as “4 to the second power”, “4 raised to the power of 2”, “the square of 4”, or “4 squared”.

Now, how about a cube of a whole number? Let’s try the following example.

A cube has edges 6 centimeters long. What is its volume?



To find the volume of the cube:

$$\begin{aligned}\text{Volume of the cube} &= 6 \text{ cm} \times 6 \text{ cm} \times 6 \text{ cm} \\ &= 216 \text{ cm}^3\end{aligned}$$

$6 \times 6 \times 6$  is called the cube of 6.

We can write  $6 \times 6 \times 6$  as  $6^3$ .

6 is the base. 3 is the exponent.

$6^3$  is read as:

*6 cubed*

*the cube of 6*

*6 to the third power*

*6 raised to the power of 3*

$$6^3$$

Let us look at more examples.

$$5^4$$

5 is the base. 4 is the exponent.

$5^4$  is read as:

*5 to the fourth power*

*5 raised to the power of 4*

$5^4$  means  $5 \times 5 \times 5 \times 5$ .

$$3^5$$

3 is the base. 5 is the exponent.

$3^5$  is read as:

*3 to the fifth power*

*3 raised to the power of 5*

$3^5$  means  $3 \times 3 \times 3 \times 3 \times 3$ .

Factored Form	Exponential Form	Base	Exponent
1) $12 \times 12 \times 12 \times 12 \times 12 \times 12$	$12^6$	12	6
2) $8 \times 8 \times 8 \times 8 \times 8 \times 8 \times 8$	$8^7$	8	7
3) $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$	$2^8$	2	8
4) $4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4$	$4^9$	4	9
5) $7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7$	$7^{10}$	7	10



## What's More

Complete the table. Write your answers on your answer sheet.

Factored Form	Base	Exponent	Exponential Notation
1) $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$			
2) $4 \times 4 \times 4 \times 4 \times 4$			
3) $10 \times 10 \times 10$			
4) $13 \times 13 \times 13 \times 13$			
5) $9 \times 9 \times 9 \times 9 \times 9 \times 9$			





## *What I Have Learned*

- A number expressed in **exponential notation** is composed of a **base** and an **exponent**.
- It is a “shorthand” way of writing repeated multiplication.
- The **base** is the number used as a repeated factor and the **exponent** indicates the number of times you are going to multiply the base or is used as factor.
- The exponent is placed at the upper right side of the base.



## *What I Can Do*

Complete the table below. Row one is done for you. Write your answers on your answer sheet.

	<b>Exponential Notation</b>	<b>Read as...</b>	<b>Meaning</b>	<b>Factored Form</b>
	$8^3$	8 to the third power 8 cubed	8 is used as a factor three times	$8 \times 8 \times 8$
1	$5^9$			
2	$6^4$			
3	$4^{12}$			
4	$12^5$			
5	$7^1$			



## Assessment

Read each item carefully. Then choose the letter of the correct answer. Write the answers on your answer sheet.

- 1) A shorter way of writing repeated multiplication is by using \_\_\_\_\_.  
A. exponential notation                      C. exponent  
B. base    . factors
- 2) Which of the following statements is FALSE?  
A. The exponent tells us how many times the base is used as a factor.  
B. 7 is the base in  $7^8$ .  
C. In an exponential notation, the base is the number used as a factor.  
D.  $11^3$  means that 3 is used as a factor 11 times.
- 3) In  $100^6$ , the number 6 is the \_\_\_\_\_.  
A. factor    C. exponential notation  
B. exponent    D. base
- 4) In exponential notation,  $9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9$  is \_\_\_\_\_.  
A.  $7 \times 9$     C.  $9^7$   
B.  $7^9$     D.  $9 \times 7$
- 5) The exponential notation  $25^6$  can be read as \_\_\_\_\_.  
A. "25 times 6<sup>th</sup> power"                      C. "25 multiplied by 6"  
B. "25 to the power of 6"                      D. "6 times 25"
- 6) Which of the following exponential notation shows that 33 is used as a factor 6 times?  
A.  $6^{33}$                       B.  $63^3$                       C.  $33^6$                       D.  $3^{36}$
- 7)  $59^8$  is read as \_\_\_\_\_.  
A. 59 to the power of 8                      C. 8 to the power of 59  
B. 5 to the 98<sup>th</sup> power                      D. 8 raised to the 59<sup>th</sup> power
- 8) In a "Pass the Bag" game, Cris picked a rolled paper with the exponential notation  $700^7$ . Which is the correct repeated multiplication for it?  
A.  $700 \times 7$                       C.  $700 \times 700 \times 700 \times 700 \times 700 \times 700 \times 700$   
B.  $7 \times 700$                       D.  $7 \times 700 \times 7 \times 700 \times 7 \times 700 \times 7 \times 700 \times 7 \times 700 \times 7$
- 9) Which exponential notation is read as "119 raised to the power of 3"?  
A.  $119^2$                       B.  $119^3$                       C.  $119^4$                       D.  $119^5$
- 10) The given number is 2095. How will you write it into an exponential notation showing that 209 will be used as a factor 5 times?  
A.  $20^{95}$                       B.  $20^{95}$                       C.  $209^5$                       D. 2095



## ***Additional Activities***

Complete the table using the given description or situation. Write your answers on your answer sheet.

Description	Base	Exponent	Exponential Notation
1) The number 7 is raised to the power of 11			
2) 34 is used as a factor eight times.			
3) Letter x is the base. It is used as a factor 20 times.			
4) You are Dino's friend. Help him identify the base and exponent in the exponential notation $86^6$ .			
5) Number 8 represents the number of times letter n is used as a factor.			
6) Mara holds a piece of paper with "74 cubed" written on it.			
7) The number whole number is 59. On its upper right side a smaller number 4 is written.			
8) The teacher instructed his pupils to write the exponential notation which means 45 is used as a factor 7 times.			
9) Steve's answer to the problem is 19. He wants to raise it to the sixth power.			
10) Letter n represents the number of times 25 is used as a factor.			



# Answer Key

<p><b>What's In</b></p> <p>1) 81 2) 343 3) 64 4) 81 5) 1 024</p>	<p><b>What's More</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Exponential Form</td> <td style="width: 25%;">Base</td> <td style="width: 25%;">Exponent</td> <td style="width: 25%;">Factor Form</td> </tr> <tr> <td>27</td> <td>2</td> <td>7</td> <td><math>2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2</math></td> </tr> <tr> <td>45</td> <td>4</td> <td>5</td> <td><math>4 \times 4 \times 4 \times 4 \times 4</math></td> </tr> <tr> <td>63</td> <td>6</td> <td>3</td> <td><math>6 \times 6 \times 6</math></td> </tr> <tr> <td>134</td> <td>13</td> <td>4</td> <td><math>13 \times 13 \times 13 \times 13</math></td> </tr> <tr> <td>93</td> <td>9</td> <td>3</td> <td><math>9 \times 9 \times 9</math></td> </tr> </table> <p style="text-align: center;"><b>What I Can Do</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Exponential Form</td> <td style="width: 25%;">Can be read as...</td> <td style="width: 25%;">Meaning</td> <td style="width: 25%;">Factor Form</td> </tr> <tr> <td>53</td> <td>5 to the third power or 5 cubed</td> <td>5 is used as a factor three times</td> <td><math>5 \times 5 \times 5</math></td> </tr> <tr> <td>64</td> <td>6 to the fourth power</td> <td>6 is used as a factor four times</td> <td><math>6 \times 6 \times 6 \times 6</math></td> </tr> <tr> <td>45</td> <td>4 to the fifth power</td> <td>4 is used as a factor five times</td> <td><math>4 \times 4 \times 4 \times 4 \times 4</math></td> </tr> <tr> <td>82</td> <td>8 to the second power or 8 squared</td> <td>8 is used as a factor 2 times</td> <td><math>8 \times 8</math></td> </tr> <tr> <td>74</td> <td>7 to the fourth power</td> <td>7 is used as a factor 4 times</td> <td><math>7 \times 7 \times 7 \times 7</math></td> </tr> </table>	Exponential Form	Base	Exponent	Factor Form	27	2	7	$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$	45	4	5	$4 \times 4 \times 4 \times 4 \times 4$	63	6	3	$6 \times 6 \times 6$	134	13	4	$13 \times 13 \times 13 \times 13$	93	9	3	$9 \times 9 \times 9$	Exponential Form	Can be read as...	Meaning	Factor Form	53	5 to the third power or 5 cubed	5 is used as a factor three times	$5 \times 5 \times 5$	64	6 to the fourth power	6 is used as a factor four times	$6 \times 6 \times 6 \times 6$	45	4 to the fifth power	4 is used as a factor five times	$4 \times 4 \times 4 \times 4 \times 4$	82	8 to the second power or 8 squared	8 is used as a factor 2 times	$8 \times 8$	74	7 to the fourth power	7 is used as a factor 4 times	$7 \times 7 \times 7 \times 7$
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Description or Situation	Base	Exponent	Exponential Notation																																														
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10)	25	n	$25^n$																																														

**Assessment**

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



## What I Know

A. Read each item carefully. Then choose the letter of the correct answer. Write the answers on your answer sheet.

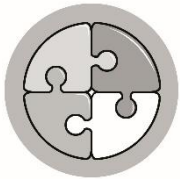
- 1) The exponential notation  $5^3$  if evaluated will be equal to \_\_\_\_\_.  
A. 15                      B. 25                      C. 115                      D. 125
- 2) In the easy category of a Math Quiz bee, the question read by the quiz master was "Evaluate:  $11^2$ ". Which will be the answer of the contestants in order to get a point?  
A. 112                      B. 121                      C. 211                      D. 22
- 3)  $8^4$  means the number 8 will be used as a factor four times. What will be the answer for this?  
A. 4 094                      B. 4 095                      C. 4 096                      D. 4 098
- 4) Miss Gracia is a Mathematics teacher. She often gives challenges to her pupils. One morning, she placed a meta-strip with the expression  $7 \times 7 \times 7 \times 7 \times 7$  on the bulletin board with the note: "*5 points will be given to pupils who can evaluate this correctly*". Who among the following pupils got the point?  
A. Carol who answered 35.                      C. Beth who answered 16 807.  
B. Ram who answered 350.                      D. Cris who answered 16 708.
- 5) Which of the following exponential notations will give the value of 729 if evaluated?  
A.  $9 \times 9 \times 9$                       C.  $9 \times 9 \times 9 \times 9$   
B.  $9 \times 9 \times 9 \times 9 \times 9$                       D.  $9 \times 9$

B. Analyze and solve. Write your answers on your answer sheet.

- 6) Three raised to 5 is \_\_\_\_\_.
- 7) Evaluate  $x^3$  if  $x = 9$
- 8) If  $a = 10$ , what is the value of  $a^3$ ?
- 9) Five raised to 6 is \_\_\_\_\_.
- 10) If  $b = 4$ , what is the value of  $b^6$ ?

**Lesson****2****Giving the Value of a Number Expressed in Exponential Notation**

In this lesson, the mastery of basic multiplication facts is necessary. You should not multiply the base and its exponent but multiply the base by the number of times as shown in the exponent.

***What's In***

A. Complete the table. Write the answers on your answer sheet. The first one is done for you.

	Base	Exponent	Meaning
Example: $5^3$	5	3	$5 \times 5 \times 5$
1) $2^5$			
2) $3^4$			
3) $8^2$			
4) $13^3$			
5) $20^5$			

B. Express each repeated multiplication in exponential notation. Write your answers on your answer sheet.

Exponential Notation

- |  |       |
|--|-------|
| 6) $4 \times 4 \times 4 \times 4 \times 4$                           | _____ |
| 7) $6 \times 6 \times 6 \times 6$                                    | _____ |
| 8) $11 \times 11 \times 11 \times 11 \times 11 \times 11$            | _____ |
| 9) $250 \times 250 \times 250$                                       | _____ |
| 10) $26 \times 26 \times 26 \times 26 \times 26 \times 26 \times 26$ | _____ |



## What's New

Read and analyze the following problem.

Grace saved ₱3.00 on Day 1, ₱9.00 on Day 2, ₱27.00 on Day 3, ₱81.00 on Day 4, and so on. If the pattern continues, how much will she save on the 7<sup>th</sup> day? How much will be her total savings?



## What is It

We can construct a table to help us solve the problem.

Day	Savings
1	₱3.00
2	₱9.00
3	₱27.00
4	₱81.00
5	?
6	?
7	?

$\left. \begin{array}{l} \text{Day 1} \\ \text{Day 2} \\ \text{Day 3} \end{array} \right\} \times 3$   
 $\left. \begin{array}{l} \text{Day 2} \\ \text{Day 3} \end{array} \right\} \times 3$   
 $\left. \begin{array}{l} \text{Day 3} \\ \text{Day 4} \end{array} \right\} \times 3$

What do you observe in the pattern?

From the table above, we can see that her savings on Day 2 is three times her savings on Day 1 ( $\text{₱}3.00 \times \text{₱}3.00 = \text{₱}9.00$ ), her savings on Day 3 is thrice her savings on Day 2 ( $\text{₱}3.00 \times (\text{₱}3.00 \times \text{₱}3.00) = \text{₱}27.00$ , and so on.

We can continue the pattern to find Grace's savings on Days 5, 6, and 7.

Day	Repeated Multiplication	Exponential Notation	Savings
1	₱3.00	$3^1$	₱3.00
2	$3 \times \text{₱}3.00$	$3^2$	₱9.00
3	$3 \times 3 \times \text{₱}3.00$	$3^3$	₱27.00
4	$3 \times 3 \times 3 \times \text{₱}3.00$	$3^4$	₱81.00
5	$3 \times 3 \times 3 \times 3 \times \text{₱}3.00$	$3^5$	₱243.00
6	$3 \times 3 \times 3 \times 3 \times 3 \times \text{₱}3.00$	$3^6$	₱729.00
7	$3 \times 3 \times 3 \times 3 \times 3 \times 3 \times \text{₱}3.00$	$3^7$	₱2 187.00
Total			₱3 729.00

Notice that we can write the amount of savings per day as repeated multiplication, which we can then write in exponential notation.

Answer: Grace will save ₱2 187.00 on Day 7.  
Her total savings in seven days will be ₱3 729.00.

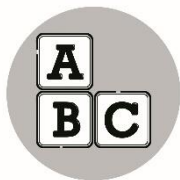
Here are more examples.

$$9^2$$

$9^2$  means 9 is used as a factor 2 times.  
 $9^2$  is  $9 \times 9$  in expanded form.  
The value of  $9^2$  is 81.

$$4^5$$

$4^5$  means 4 is used as a factor 5 times.  
 $4^5 = 4 \times 4 \times 4 \times 4 \times 4 = 1\,024$ .  
The value of  $4^5$  is 1 024.



### ***What's More***

Write each of the following in expanded form and find its value. Write your answers on your answer sheet.

Exponential Notation	Expanded Form	Value
1) $2^7$		
2) $4^5$		
3) $6^3$		
4) $7^4$		
5) $9^3$		



### ***What I Have Learned***

To find the value of a number expressed in exponential notation, write the number as repeated multiplication. Then multiply to find the product.





## ***What I Can Do***

Evaluate each expression. Write your answers on your answer sheet.

1)  $3^4 =$  \_\_\_\_\_

2)  $4^3 =$  \_\_\_\_\_

3)  $8^2 =$  \_\_\_\_\_

4)  $6^3 =$  \_\_\_\_\_

5)  $7^2 =$  \_\_\_\_\_

6)  $9^5 =$  \_\_\_\_\_

7)  $10^4 =$  \_\_\_\_\_

8)  $80^2 =$  \_\_\_\_\_

9)  $12^5 =$  \_\_\_\_\_

10)  $50^3 =$  \_\_\_\_\_



## Assessment

A. Give the value of each number and write your answers on your answer sheet.

- 1) The first item of your formative test states: "Evaluate  $2^7 = \underline{\hspace{2cm}}$ . Which will be the correct answer?  
A. 182                      B. 14                      C. 128                      D. 281
- 2) The following exponential notation if evaluated will give a three-digit product **except one**. Which one is it?  
A.  $11^2$                       B.  $10^3$                       C.  $8^3$                       D.  $12^2$
- 3) Which among the statements below is FALSE?  
A. If  $n = 7$ , then  $n^3$  is equal to 343.  
B. If  $p = 14$ , then  $p^2 = 169$   
C. If  $y = 21$ , then  $y^3$  is 9 261.  
D. If  $h = 30$ , then  $h$  raised to the power of 2 is 900.
- 4) Which of the following exponential notations is equal to 1 936?  
A.  $44^2$                       B.  $33^2$                       C.  $55^2$                       D.  $22^2$
- 5) If  $n = 16$ , what exponent will be placed in  $n^{\square}$  to give a value of 4 096?  
A. 4                      B. 5                      C. 2                      D. 3

B. Analyze and solve. Write your answers on your answer sheet.


- 6) Eight raised to 5 is \_\_\_\_\_.
- 7) Evaluate  $x^4$  if  $x = 12$
- 8) If  $a = 7$ , what is the value of  $a^5$ ?
- 9) Ten raised to 6 is \_\_\_\_\_.
- 10) If  $b = 8$ , what is the value of  $b^5$ ?



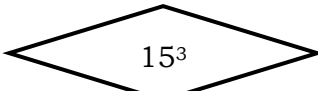

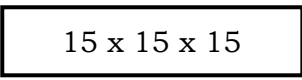
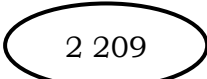
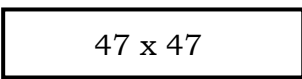
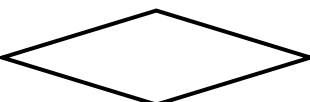

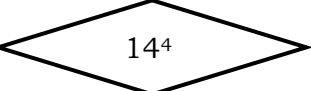
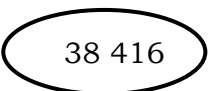
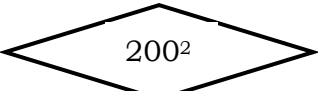
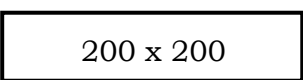

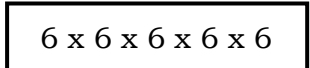
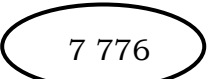
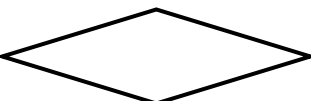

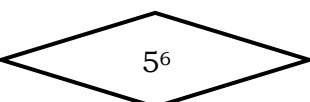
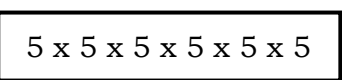
## Additional Activities

A. Fill in the blank shape in each item. Write your answers on your answer sheet. The first item with missing value is done for you.

Legend:  Value

 Factored form or expression

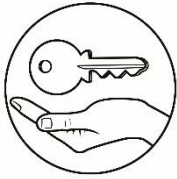
 Exponential Notation

- 1)   $15^3$   3 375   $15 \times 15 \times 15$
- 2)  2 209   $47 \times 47$  
- 3)    $14^4$   38 416
- 4)   $200^2$    $200 \times 200$  
- 5)   $6 \times 6 \times 6 \times 6 \times 6$   7 776 
- 6)    $5^6$    $5 \times 5 \times 5 \times 5 \times 5 \times 5$

B. Give what is being asked. Write your answers on your answer sheet.

Think of an exponential notation to get the value of:

- 1)  $64 =$  \_\_\_\_\_
- 2)  $27 =$  \_\_\_\_\_
- 3)  $121 =$  \_\_\_\_\_
- 4)  $49 =$  \_\_\_\_\_
- 5)  $256 =$  \_\_\_\_\_



## Answer Key

<p><b>What I Can Do</b></p> <p>A. 1) 81      6) 50 049            2) 64      7) 10 000            3) 64      8) 6 400            4) 216     9) 248 832            5) 49      10) 125 000</p> <p><b>Assessment</b></p> <p>A. 1) C            2) B            3) B            4) A            5) D</p> <p>B. 6) 32 768            7) 20 736            8) 16 807            9) 1 000 000            10) 32 768</p> <p><b>Additional Activities</b></p> <p>A. 1) 3 375            2) 472            3) <math>14 \times 14 \times 14 \times 14</math>            4) 40 000            5) <math>6^5</math></p> <p>B. 6) 15 625            1) <math>2^6, 4^3, 8^2</math>            2) <math>3^3</math>            3) 112            4) 72            5) 162</p>	<p><b>What I Know</b></p> <p>A. 1) D            2) B            3) C            4) C            5) A            6) 243            7) 729            8) 1 000            9) 15 625            10) 4 096</p> <p><b>What's In</b></p> <p>A. Base Exponent Meaning            1) 25    2    <math>2 \times 2 \times 2 \times 2 \times 2</math>            2) 34    3    <math>3 \times 3 \times 3 \times 3</math>            3) 82    8    <math>8 \times 8</math>            4) 133    13    <math>13 \times 13 \times 13</math>            5) 205    20    <math>20 \times 20 \times 20 \times 20 \times 20</math></p> <p>B. 6) 45            7) 64            8) 116            9) 2503            10) 267</p> <p><b>What's More</b></p> <table border="1"> <thead> <tr> <th>Expanded Form</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td><math>1 \ 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2</math></td> <td>128</td> </tr> <tr> <td><math>2 \ 4 \times 4 \times 4 \times 4 \times 4</math></td> <td>1 024</td> </tr> <tr> <td><math>3 \ 6 \times 6 \times 6</math></td> <td>216</td> </tr> <tr> <td><math>4 \ 7 \times 7 \times 7 \times 7</math></td> <td>2 401</td> </tr> <tr> <td><math>10 \ 9 \times 9 \times 9</math></td> <td>729</td> </tr> </tbody> </table>	Expanded Form	Value	$1 \ 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$	128	$2 \ 4 \times 4 \times 4 \times 4 \times 4$	1 024	$3 \ 6 \times 6 \times 6$	216	$4 \ 7 \times 7 \times 7 \times 7$	2 401	$10 \ 9 \times 9 \times 9$	729
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## References

- DepEd Most Essential Learning Competencies (MELC) for Mathematics 6
- Bureau of Elementary Education, Department of Education 2010, Lesson Guide in Elementary Mathematics 6, Book Media Press, Inc., 319-323
- Bureau of Elementary Education, Department of Education, Distance Education for Elementary Schools, Self-Instructional Materials on Exponents

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