

# Mathematics

## Quarter 1 - Module 8: Scientific Notations and Solving Problems involving Real Numbers



**AIRs - LM**

## MATHEMATICS 7

Quarter 1 - Module 8: Scientific Notations and Solving Problems involving Real Numbers  
First Edition, 2021

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Region I

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### Development Team of the Module

**Author:** Marc Vincent Pacio and Margie N. Acosta  
**Editor:** SDO La Union, Learning Resource Quality Assurance Team  
**Content Reviewer:** Maryjane A. Gacusan and Richard O. Dizo  
**Language Reviewer:** Gema D. Jarata and Erliza D. Areola  
**Illustrator:** Ernesto F. Ramos Jr.  
**Design and Layout:** Christian R. Bumatay

### Management Team:

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*Assistant Schools Division Superintendent*  
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Belen C. Aquino, Ph D, *EPS in Charge of English*  
Michael Jason D. Morales, *PDO II*  
Claire P. Toluyen, *Librarian II*

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### Department of Education – SDO La Union

Office Address: Flores St. Catbangan, San Fernando City, La Union  
Telefax: 072 – 205 – 0046  
Email Address: launion@deped.gov.ph

# 7

# MATHEMATICS

## Quarter 1 - Module 8: Scientific Notations and Solving Problems involving Real Numbers



## Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



## **Target**

This module was designed and written with you in mind. It is here to help you master your skills in writing numbers in scientific notation and vice versa, and solve problems involving real numbers. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course.

After going through this module, you are expected to:

### **Learning Competencies:**

1. write numbers in scientific notation and vice versa (M7NS-Ii-1)
2. represent real-life situations and solve problems involving real numbers (M7NS-Ij-1)

### **Learning Objectives:**

1. Define scientific notation.
2. Identify the steps in writing decimal numbers into scientific notation.

Before going on, check how much you know about this topic.

## PRE – ASSESSMENT

**Directions:** Read each statement below carefully. Select the letter of the correct answer. Write your answer on a separate sheet of paper.

1. Which of the following represents a standard notation?  
A.  $1.70 \times 10^2$                       B.  $1.7 \times 10^3$                       C. 0.000017                      D.  $1.7 \times 1000$
2. What is the standard notation of  $1.02 \times 10^4$ ?  
A. 12000                      B. 10200                      C. 1200000                      D. 1020000
3. Earth's approximate distance from the Sun is about  $1.4956 \times 10^8$  km. Which of the following notation represents the distance?  
A. 1,495,600                      B. 14,956,000                      C. 149,560,000                      D. 1,495,600,000
4. Which allows us to express a very small or very large number in a compact form?  
A. Scientific Form                      B. Standard Form  
C. Scientific Notation                      D. Standard Notation
5. Which of the following **CANNOT** be expressed in scientific notation?  
A. -0.00073                      B.  $7/3$                       C. 7.30000                      D. 73 million
6. In the given expression  $5.02 \times 10^{-2}$ , which of the following is the coefficient or the number part?  
A. -2                      B. 5                      C. 5.02                      D. 10
7. Which of the following represents  $3.5 \times 10^{-2}$  in standard notation?  
A. 0.0035                      B. 0.035                      C. 350                      D. 3500
8. According to the history, the first pandemic was the "Spanish flu", also known as the 1918 flu pandemic which killed about 10 million people. What is 10 million in scientific notation?  
A.  $1 \times 10^5$                       B.  $1 \times 10^6$                       C.  $1 \times 10^7$                       D.  $2 \times 10^8$
9. The planet Mercury has an estimated distance of  $1.35 \times 10^8$  miles from the Sun. How far is Mercury from the Sun in standard notation?  
A. 13,500 miles                      B. 1,350,000 miles  
C. 13,500,000 miles                      D. 135,000,000 miles
10. Which of the following has a negative exponent on 10 when converted into scientific notation?  
A. -45000                      B. 0.00045                      C. 45                      D. 400005
11. In his first month at school, Marc saved P450.00. At the next month at school, Marc saved P225.00. Then he donated P300.00 of his savings. How much money does Jim have left now?  
A. P255.00                      B. P265.00                      C. P375.00                      D. P385.00

12. Kimberly spent P2,100 for shoes. This was P700 less than twice what she spent for a blouse. How much was the blouse?
- A. ₱1,000                      B. ₱1,200                      C. ₱1,400                      D. ₱1,600
13. Today, Richie's age (B) is 4 times Carlo's age. In 4 years, what will Carlo's age be in terms of B?
- A.  $4B + 4$                       B.  $4(B + 4)$                       C.  $\frac{B}{4} + 4$                       D.  $\frac{B+4}{4}$
14. An ant moves forward 15.9 inches in one hour. It turns around and crawls 10.7 inches in the next hour. Finally, in the third hour, it turns around again and crawls 5.3 more inches. How much forward progress did the ant make in 3 hours?
- A. 10 inches                      B. 10.25 inches                      C. 10.5 inches                      D. 10.75 inches
15. A class of 50 students is divided into two groups; one group has two less than the other; how many are in each group?
- A. 24 & 26                      B. 25 & 25                      C. 27 & 23                      D. 28 & 22



## ***Jumpstart***

Let us begin this lesson by reviewing the past topics about multiplying numbers by powers of 10 and evaluating real numbers. The knowledge and mathematical skill mentioned will help you to write numbers in scientific notation and vice versa, and solve problems involving real numbers.

### **Activity 1: Find My Product!**

Find each product:

1.  $0.031 \times 10$

2.  $6.221 \times 100$

3.  $0.114 \times 1000$

4.  $1.021 \times 0.1$

5.  $11.4 \times 0.001$

### **Activity 2: Evaluate Me!**

Evaluate the following real numbers:

1.  $|5| + |4|$

2.  $0.4 \div 10$

3.  $\frac{1}{4} + \frac{2}{3}$

4.  $3 \times 1\frac{1}{2}$

5.  $\frac{1}{3} - \frac{1}{4}$

6.  $\left(\frac{3}{8}\right)\left(\frac{8}{5}\right)$

7.  $\frac{2}{5} + \frac{3}{5}$

8.  $-1 + (-1) + [-(9 + 4)]$

9. the value of  $x + y$  if  $x = 4$  and  $y = 6$

10.  $9^2 + 3^3$





## Discover

Below are some important matters that we need to discuss in order for you to understand how to (1) write numbers in scientific notation and vice versa; and (2) solve problems involving real numbers. Read carefully and understand all salient points written in this part of the module.

### Lesson 1: Writing Numbers in Scientific Notations and Vice Versa

**Scientific notation** simplifies the way we write very large and very small numbers in a compact form. The primary components of a number written in scientific notation are as follows:

$$c \times 10^n$$

A scientific notation is composed of:

- **number part** called **coefficient** or “*c*” (a number greater than or equal to 1 but less than 10)
- a number with **base 10** raised to an integer power (**n**)

#### A. How to Write Numbers in Scientific Notation

##### Steps in Writing Decimal Numbers into Scientific Notation

**STEP 1:** Identify the initial location of the *original decimal* point.

**STEP 2:** Identify the **final location** or “destination” of the original decimal point.

- The **final location** of the *original decimal* point must be directly **to the right of the first nonzero number**.

**STEP 3:** Move the *original decimal* point to its **final location**.

- You will get a number here called “*c*”. Its value **must** be greater than or equal to 1, but less than 10.
- When the decimal is moved *towards the left*, the count for the exponent of base 10 should be *positive*.
- When the decimal is moved *towards the right*, the count for the exponent of base 10 should be *negative*.

**STEP 4:** Write “*c*” multiplied by some power of base 10. It should look something like this  $c \times 10^n$ .

**Examples:**

1.  $3800 = 3.8 \times 10^3$

3.  $0.0005 = 5 \times 10^{-4}$

2.  $43335000000 = 4.3335 \times 10^{10}$

4.  $0.000001134 = 1.134 \times 10^{-6}$

**B. Convert Scientific Notation to a Standard Notation****Examples:**

1.  $3.456 \times 10^4 = 3.456 \times 10000 = 34560$

2.  $3.456 \times 10^{-4} = 3.456 \times 0.0001 = 0.0003456$

3.  $8.84 \times 10^{10} = 8.84 \times 10000000000 = 884\,000\,000$

4.  $8.84 \times 10^{-10} = 8.84 \times 0.0000000001 = 0.000000000884$

## Lesson 2: Solving Problems Involving Real Numbers

In solving problems involving real numbers, mastery in performing fundamental operations on different properties are needed.

### Examples:

1. There are 8 packs of fruit juice in a box. How many boxes needed if 40 people are attending the meeting with each receiving 6 packs of fruit juice?

**Solution:**

$$\begin{aligned} &= (40 \times 6) \div 8 \\ &= 240 \div 8 \\ &= 30 \end{aligned}$$

**Answer:** 30 boxes of fruit juice will be needed

2. Lucas added three-fourths of a bag of soil to his garden while Matthew added six-fifths bags of soil to his garden. How much more soil did Matthew add than Lucas?

**Solution:**

$$\begin{aligned} &= \frac{6}{5} - \frac{3}{4} \\ &= \frac{6(4) - 3(5)}{5(4)} \\ &= \frac{24 - 15}{20} \\ &= \frac{9}{20} \end{aligned}$$

**Answer:** Matthew added  $\frac{9}{20}$  more bags of soil to his garden.

3. Four years ago, Mark's age was half of the age he will be in 10 years. How old is he now?

**Solution:**

Mark's age 4 years ago	Mark's age in 10 years	Half of the age he will be in 10 years
$x - 4$	$x + 10$	$\frac{1}{2}(x + 10)$

$$x - 4 = \frac{1}{2}(x + 10)$$

$$x - 4 = \frac{1}{2}x + 5$$

$$x - \frac{1}{2}x = 5 + 4$$

$$\frac{1}{2}x = 9$$

$$x = 18$$

**Answer:** Mark is now 18 years old.

4. Zac has 1000 coins in his coin bank consisting of 10-peso coin and 5-peso coin. If the total cash is P5,500. How many of each type of coins are in the coin bank?

**Solution:**

Let  $x$  be the number of 10-peso coin and  $1000 - x$  be the number of 5-peso coin.

$$10x + 5(1000 - x) = 5500$$

$$10x + 5000 - 5x = 5500$$

$$10x - 5x = 5500 - 5000$$

$$5x = 500$$

$$x = 100$$

$$1000 - x = 900$$

**Answer:** There are 100 10-peso coin and 900 5-peso coin.

5. On the last Mathematics quiz, Lani answered  $\frac{4}{9}$  of the problems correctly while Mae answered  $\frac{9}{10}$  of the item correctly. If each problem is worth the same amount, who got the higher score?

**Solution:**

$$\frac{4}{9} \text{ — } \frac{9}{10}$$

$$4 \times 10 \text{ — } 9 \times 9$$

$$40 < 81$$

**Answer:** Mae got the higher score than Lani.



## Explore

### Activity 3: Transform Me!

A. Write each number in scientific notation:

1. 46144
2. 540 000
3. 20 000
4. 0.00045
5. 0.0000125

B. Write the following numbers in standard notation:

1.  $1.23 \times 10^2 =$  \_\_\_\_\_
2.  $1.05 \times 10^{-3} =$  \_\_\_\_\_
3.  $2.678 \times 10^5 =$  \_\_\_\_\_
4.  $5.001 \times 10^{-4} =$  \_\_\_\_\_
5.  $7.88 \times 10 =$  \_\_\_\_\_

How did you find the activity? What mathematical concepts did you use? Now, here is another activity that lets you apply what you have learned about solving problems involving real numbers.

### Activity 4: Solve Me!

Solve the following problems.

1. Adan has 100 coins, all in 5 and 1 peso coins, amounting to Php180.00. How many 1 peso coins does he have?
2. On their previous exam, Nicole answered  $\frac{5}{8}$  on the questions correctly and Jen answered  $\frac{7}{11}$  of it correctly. If each problem is worth the same amount, who got the higher score?
3. It takes Metchel nine hours to pick fifty boxes of mangoes. Janine can pick the same amount in 11 hours. How long would it take them if they worked together? (in hours)



## Deepen

### Activity 5: Express Me!

1. The speed of light is 186,000 miles per second, or about 671,000,000 miles per hour. How would you express these numbers in scientific notation?
2. The speed of sound depends on the type of medium and the temperature of the medium it is traveling through. The speed of sound in dry air at 15°C (59°F) is about 763 miles per hour. Rewrite this number in scientific notation.
3. The radius of a hydrogen atom is  $2.5 \times 10^{-11}$  m. Express this number in standard notation.

### Activity 6: Think Deeper!

Read the situations carefully and answer is being asked. Show your solutions.

1. It takes Ellen 4 hours to paint one room. If Sam helps, it takes them 2 hours. How long would it take for Sam to paint one room alone?
2. Grace wants to buy a television worth 17, 800 pesos. If she buys it using her credit card, she needs to pay 2, 222 pesos for 9 months. How much more is the price of the television when purchased on credit card than in cash?

### Rubric for Problem Solving

4	3	2	1
Used an appropriate strategy to come up with a correct solution and arrived at a correct answer	Used an appropriate strategy to come up with a solution, but a part of the solution led to an incorrect answer	Used an appropriate strategy but came up with an entirely wrong solution that led to an incorrect answer	Attempted to solve the problem but used an inappropriate strategy that led to a wrong solution



- Which of the following expresses a very small or very large number in a compact form?  
A. Scientific Form  
B. Standard Form  
C. Scientific Notation  
D. Standard Notation
- Which of the following **CANNOT** be expressed in scientific notation?  
A. -0.00053  
B. 5/3  
C. 5.30000  
D. 53 million
- What is Four Hundred Thousand in scientific notation?  
A.  $4 \times 10^{-5}$   
B.  $4 \times 10^{-4}$   
C.  $4 \times 10^4$   
D.  $4 \times 10^5$
- Which of the following represents a standard notation?  
A.  $1.44 \times 10^2$   
B.  $1.44 \times 10^3$   
C. 0.0000144  
D.  $1.44 \times 1000$
- According to the history, the first pandemic was the “Spanish flu”, also known as the 1918 flu pandemic which killed about 10 million people. What is 10 million in scientific notation?  
A.  $1 \times 10^6$   
B.  $1 \times 10^7$   
C.  $2 \times 10^5$   
D.  $2 \times 10^8$
- Earth’s approximate distance from the Sun is about  $1.4956 \times 10^8$  km. Which of the following notation represents the distance?  
A. 1,495,600  
B. 14,956,000  
C. 149,560,000  
D. 1,495,600,000
- The planet Mercury has an estimated distance of  $1.35 \times 10^8$  miles from the Sun. How far is Mercury from the Sun in standard notation?  
A. 13,500 miles  
B. 1,350,000 miles  
C. 13,500,000 miles  
D. 135,000,000 miles
- When 4 million converted into scientific notation, what is the power of 10 to complete the task?  
A. 3  
B. 4  
C. 5  
D. 6
- Which of the following has a negative exponent on 10 when converted into scientific notation?  
A. -23000  
B. 0.00023  
C. 23  
D. 200003
- In the given expression  $1.02 \times 10^{-2}$ , which of the following is the coefficient or the number part?  
A. -2  
B. 1  
C. 1.02  
D. 10
- Eden spent P4,600 for shoes. This was P1,200 less than twice what she spent for a blouse. How much was the blouse?  
A. P2,800  
B. P2,850  
C. P2,900  
D. P2,950
- A class of 40 students is divided into two groups; one group has eight less than the other; how many are in each group?  
A. 16 & 24  
B. 18 & 22  
C. 20 & 20  
D. 26 & 14



13. Today, Marlon's age (B) is 5 times Adan's age. In 3 years, what will Adan's age be in terms of B?
- A.  $5B + 3$                       B.  $5(B + 3)$                       C.  $\frac{B}{5} + 3$                       D.  $\frac{B+3}{5}$
14. An ant moves forward 20.7 inches in one hour. It turns around and crawls 8.6 inches in the next hour. Finally, in the third hour, it turns around again and crawls 10.4 more inches. How much forward progress does the ant make in 3 hours?
- A. 9.3 inches                      B. 14.1 inches                      C. 18.3 inches                      D. 22.5 inches
15. In his first month at school, Kier saved P250.00. At the next month at school, Kier saved P120.00. Then, he donated P200.00 of his savings. How much money does Jim have left now?
- A. ₱150.00                      B. ₱160.00                      C. ₱170.00                      D. ₱180.00

# References

## A. Books

- Bernabe, Julieta G. Elementary Algebra: Textbook for First Year. Quezon City. SD Publications, Inc., 2009
- Miller, Julie, O'Neill, Molly, and Hyde, Nancy. Introductory Algebra: Second Edition. New York. McGraw-Hill Companies, Inc., 2009
- Miller, Julie, O'Neill, Molly, and Hyde, Nancy. Intermediate Algebra: Second Edition. New York. McGraw-Hill Companies, Inc., 2010
- Amar, Cherry Mae R., et al. Mathematics – Grade 7 Alternative Delivery Mode Quarter 1 – Module 10: Scientific Notations & Solving Problems involving Real Numbers: First Edition. SOCCSKSARGEN Region. Department of Education. 2020
- Learner's Module, K-12 Grade 7 Mathematics (First Quarter)

## B. Links

- <https://www.mathsisfun.com/numbers/scientific-notation.html>
- <https://www.chilimath.com/lessons/introductory-algebra/writing-numbers-in-scientific-notation/>
- <https://courses.lumenlearning.com/prealgebra/chapter/problem-set-real-numbers/>
- <https://cejerl.files.wordpress.com/2012/06/problems-on-real-numbers-final-tg.pdf>

**For inquiries or feedback, please write or call:**

Department of Education – SDO La Union  
Curriculum Implementation Division  
Learning Resource Management Section  
Flores St. Catbangan, San Fernando City La Union 2500  
Telephone: (072) 607 - 8127  
Telefax: (072) 205 - 0046  
Email Address:  
launion@deped.gov.ph  
lrm.launion@deped.gov.ph