



SUBJECT:- MATHEMATICS

CHAPTER:-6

TOPIC:- Exponents and Powers (Part 2)

GUIDELINES

Dear students, kindly refer to the following notes/video links based on the Chapter-“EXPONENT ANS POWERS ” and thereafter attempt the questions in your Mathematics notebook.

NOTE- Students can download NCERT book using the following link:

<http://ncert.nic.in/textbook/textbook.htm?hemh1=0-16>

INTRODUCTION

Scientific notation is just a short hand way of expressing gigantic numbers like 1,300,000 or incredibly small numbers like 0.000000000045. Also known as exponential form, scientific notation has been one of the oldest mathematical approaches. It is favored by many practitioners. If numbers are too big or too small to be simply calculated, people refer to scientific notation to handle these circumstances. This method is used by engineers, mathematicians and scientists.

An example of scientific notation is 1.3×10^6 which is just a different way of expressing the standard notation of the number 1,300,000.

The general form of a number in scientific notation is:

$a \times 10^n$ where $1 \leq a < 10$ and n is an integer. In other words the number that we'll call "a" is multiplied by 10, raised to some exponent n .

Example - Let a number be 3500

We can express this number in many ways using exponent.

$$3500 = 35 \times 100 = 35 \times 10^2$$

$$3500 = 350 \times 10 = 350 \times 10^1$$

$$3500 = 3.5 \times 1000 = 3.5 \times 10^3$$

$$3500 = 0.35 \times 10000 = 3.5 \times 10^4$$

All of these are representation of the number 3500 in exponent form. But the standard form of the number 3500 is that number which is expressed as number between 1 and 10.

So the Standard form is $3500 = 3.5 \times 10^4$

We can express very small numbers in standard form using negative exponents.

Example- Express 0.0053 in standard form.

Answer:

$$0.0053 = 53/10000 = (5.3 \times 10)/10^4 = 5.3 \times 10 \times 10^{-4} = 5.3 \times 10^{-3}$$

SUBTOPICS

- 1) Large numbers in Standard Form
- 2) Small numbers in Standard Form

Key points and important links for reference

- 1) Introduction of Standard form (Click on the link below)

<https://www.youtube.com/watch?v=LfRnYsTg8pg>

Also refer to Example 8 and 9 given in the chapter 'Exponents and Powers' in the NCERT textbook.

- 2) Click on the link given below for some more examples to understand this concept better.

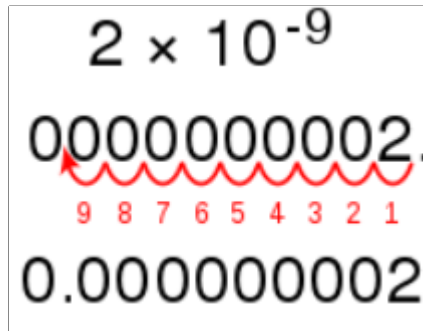
<https://www.youtube.com/watch?v=m665COqqdeQ>

POINTS TO REMEMBER

1. Standard form of writing natural numbers like xyz000000.....

$$\begin{array}{c} 2 \times 10^9 \\ 2.000000000 \\ \text{1 2 3 4 5 6 7 8 9} \\ 2,000,000,000 \end{array}$$

2. Standard form of writing decimal numbers like 0.00000.....xyz.



3. Any number can be expressed as a decimal number between 1.0 and 10.0 (including 1.0) multiplied by a power of 10. Such a form of a number is called its standard form. $A \times 10^n$, where $1.0 \leq A < 10$ and n is some integer.

4. Standard form expresses very large and very small numbers in a manner which is convenient to read, write and compare.

5. Standard form is also called scientific notation form.

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1) Exercise 12.2 from the NCERT textbook (to be done in Mathematics notebook)

Q1 (i), (ii), (v)

Q2 (i), (ii) (iv) (v)

Q3. (i), (iv) (v)

2) **Objective type questions** (From the examination point of view; to be done in practice notebook)

Q1. The usual form of 3.41×10^6 is _____

Q2. The standard form for 0.000064 is

A) 64×10^4 B) 64×10^{-4} C) 6.4×10^5 D) 6.4×10^{-5}

Q 3. Usual form of 3.23×10^{-6} -----

Q4. State true or false. The standard form for 0.000037 is 3.7×10^{-5} .

Q5. Express each of the following in standard form:

a) A Helium atom has a diameter of 0.000000022 cm.

