BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI - 110034

SUBJECT:- MATHEMATICS

CHAPTER:-6

TOPIC:- Exponents and Powers(Part1)

GUIDELINES

Dear students, kindly refer to the following notes/video links for the Chapter-"EXPONENT AND POWERS" and thereafter attempt the questions in Mathematics notebook.

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

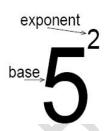
http://ncert.nic.in/textbook/textbook.htm?hemh1=0-16

INTRODUCTION

We know how to calculate the expression 5 x 5. This expression can be written in a shorter way using something called exponents.

$$5x5=5^{2}$$

An expression that represents repeated multiplication of the same factor is called a power. The number 5 is called the base, and the number 2 is called the exponent.



3 ¹ 3 to the power 1	3
4 ² 4 to the power 2	4 x4
5 ³ 5 to the power 3	5 x 5 x 5
2 ⁶ 2 to the power 6	2 x2 x 2 x 2 x 2 x 2 x 2

In mathematics, we use superscripts to represent the number of times the number is multiplied by itself. These superscripts are the exponents.

Exponents shorten writing out long strings of repeated multiplication. For example, $3\times2\times2\times3\times3\times2\times2 = 2\times2\times2\times3\times3\times3 = 2^43^3$.

In the expression a^n , we are saying that a is being multiplied by itself n number of times. We call a the base, and n is the exponent. The expression a^n is called a **power**, and is read as, "a raised to the power of n" or "a to the nth power." In my above example of 2^{10} , 2 is the base, 10 is the exponent (the number of times 2 is multiplied by itself), and we read it as "2 raised to the 10th power". Some powers are special because they come up quite frequently like a^2 can also be read as "asquared," and a^3 as "a-cubed."

SUBTOPICS

- 1) Powers with positive exponents
- 2) Powers with negative exponent
- 3) Expansion of decimal numbers
- 4) Laws of exponents

IMPORTANT POINTS WITH THEIR LINKS FOR REFERENCE

1) Introduction

https://www.examfear.com/free-video-lesson/Class-8/Maths/Exponents-and-Powers/part-1.htm

2) What are exponents

https://www.youtube.com/watch?v=4qHe68w4Nul&feature=emb_rel_end

3) Negative exponent

https://www.youtube.com/watch?v=rwFgnRss-do

4) Expansion of large numbers

https://www.youtube.com/watch?v=yvSyObj59Pk

5) laws of exponents

https://www.youtube.com/watch?v=bLCtYNIdw4E

6) some examples for reference

https://www.youtube.com/watch?v=S4BbEDuMnAU

POINTS TO REMEMBER

- 1) $x^1 = x$. Any number raised to the power of "1" equals itself.
- 2) $x^0 = 1$. Any non-zero number raised to the power 0 equal to 1.
- 3) $x^{-1} = 1/x$. Any non-zero number raised to a negative power equals its reciprocal raised to the same but positive power.
- 4) $x^m x^n = x^{m+n}$. When multiplying 2 powers that have the same base, you can add the exponents.

- 5) $x^m/x^n = x^{m-n}$. Divide 2 powers with the same base by subtracting the exponents.
- 6) $((x)^m)^n = (x)^{mn}$. Multiply the powers when the power is raised by another power.

7)
$$(xy)^{m} = x^{m} * y^{m}$$

$$\frac{x^{m}}{y^{m}} = \left(\frac{x}{y}\right)^{m}$$

Some important points to remember

- Follow the order of operations .
- Remember that exponents are repeated multiplication. 2³ is not the same as 2×3! It means 2×2×2.
- Be careful evaluating exponents with negative bases. Use parenthesis when necessary to help you remember.
- Negative exponents are the same as repeated division of one by a number.
- Negative exponents don't make a number negative ie $.2^{-3} = 1/2^3 = 1/8 = 0.125$, not -8.

ASSIGNMENT

1). From NCERT textbook the following questions are to be

done in Mathematics notebook:

- 2) Practice assignment on Exponents and Powers (for online practice only).
- 1 https://www.khanacademy.org/math/in-in-class-8th-math-cbse/xa9e4cdc50bd97244:in-in-8th-exp-negative-exponents/e/exponents 2?modal=1

2<u>https://www.khanacademy.org/math/in-in-class-8th-math-cbse/xa9e4cdc50bd97244:in-in-8th-exp-powers/xa9e4cdc50bd97244:in-in-8th-exp-negative-exponents/e/exponent_rules?modal=1</u>

3https://www.khanacademy.org/math/in-in-class-8th-math-cbse/xa9e4cdc50bd97244:in-in-8th-exp-powers/xa9e4cdc50bd97244:in-in-8th-exp-negative-exponents/e/powers-of-powers-int-exp?modal=1

4 https://www.khanacademy.org/math/in-in-class-8th-mathcbse/xa9e4cdc50bd97244:in-in-8th-exp-powers/xa9e4cdc50bd97244:in-in-8th-expnegative-exponents/e/properties-of-integer-exponents?modal=1

3) **Objective type questions** (to be done in a separate Mathematics practice notebook)

Q1.	What is the value of 2 ⁻⁵ ?)
QΙ.	vviiat is the value of Z :	

Multiplicative inverse of 2⁻⁷ is Q2.

- A) 2⁻⁷
 - B) 7^2 C) 2^7
- D) 7⁻²

- A)base
- B) constant
- C) exponent D) none of the above

Q4. The value of
$$3^5/3^{-6}$$
 is

- A) 3⁵
- B) 3⁻⁶ C) 3¹¹
- D) 3⁻¹

Q5. If y be any non zero integer, the
$$y^0$$
 is equal to

- A) 1
- B) 0
- C) -1
- D) not defined

Q6.
$$[2^{-1} + 3^{-1} + 4^{-1}]^0 =$$

What is the value of $4^0 - 3^3$? Q7.

What is the value of $(-3)^4$ Q8.

On dividing 8⁵ by _____ we get 8. Q9.

The value for $(-7)^6/7^6$ is _____. Q10.

True/False: Q11.

A)
$$(-2)^0 = 2$$

B)
$$(-7)^{-4} \times (-7)^2 = (-7)^{-2}$$

C)
$$a^2 = \frac{1}{(a)-2}$$

The expression of 4^{-3} as a power with base 2 is 2^6 . D)