Class 7-Mathematics

Instructions for students: The notes provided must be copied to the Maths copy and then do the homework in the same copy.

Chapter 4

EXPONENTS

Definition: If $'a'$ is any rational number and 'n' is any natural number,

$a \times a \times a \times a \times \ldots\ldots \times a(n\ times) = a^n$, a is known as the Base and n is known as the Exponent or **Index** or **Power**.

Examples:

Number	Exponential form	Base	Exponent
16	$2\times2\times2\times2 = 2^4$	2	4
243	$3\times3\times3\times3\times3 = 3^5$	3	5
-125	$(-5)\times(-5)\times-(5) = (-5)^3$	-5	3
$\frac{81}{256}$	$\frac{3}{4}\times\frac{3}{4}\times\frac{3}{4}\times\frac{3}{4} = \left(\frac{3}{4}\right)^4$	$\frac{3}{4}$	4

Exercise 4.1

3. Express the following in the exponential form:

i) $6 \times 6 \times 6 \times 6 \times 6 = 6^5$

iii) $2\times2\times a\times a\times a\times a = 2^2a^4$

5. Simplify the following

i) $(-3) \times (-2)^3 = -3\times -2\times-2\times-2$

$= 24$

iii) $(-2)^3 \times (-10)^4 = (-2)\times(-2)\times(-2)\times(-10)\times(-10)\times(-10)\times(-10)$

$= (-8)\times10000$

$= -8000$

iv) $(-1)^9 = -1$ (Since 9 is odd)

9. Write the following as power of -3

i) $9 = (-3) \times (-3) = (-3)^2$

ii) $-27 = (-3) \times (-3)\times(-3) = (-3)^3$

iii) $81 = (-3) \times (-3)\times (-3) \times (-3) = (-3)^4$

10. Find the value of x.

i) $(-8)^x = -512$

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$-512 = \underline{(-2)\times(-2)\times(-2)}\times \underline{(-2)\times(-2)\times(-2)}\times \underline{(-2)\times(-2)\times(-2)}$

$(-2)\times(-2)\times(-2) = -8$

$= (-8)\times(-8)\times(-8)$

$= (-8)^3$

$(-8)^x = -512$

$\Rightarrow (-8)^x = (-8)^3$

$\Rightarrow x = 3$

vi) $\left(-\frac{3}{4}\right)^x = -\frac{243}{1024}$ [Do the prime factorisation of 243 and 1024]

$\Rightarrow \left(-\frac{3}{4}\right)^x = \left(-\frac{3}{4}\right)\times\left(-\frac{3}{4}\right)\times\left(-\frac{3}{4}\right)\times\left(-\frac{3}{4}\right)\times\left(-\frac{3}{4}\right)$

$\Rightarrow \left(-\frac{3}{4}\right)^x = \left(-\frac{3}{4}\right)^5$

$\Rightarrow x = 5$

11. Write the prime factorisation of the following number in exponential form:

v) 2280

2	2280
2	1140
2	570
3	285
5	95
19	19
	1

2280 = 2×2×2×3×5×19

Exponential form of 2280= $2^3 \times 3^1 \times 5^1 \times 19$.

viii) 8400

2	8400
2	4200
2	2100
2	1050
3	525
5	175
5	35
	7

8400 = 2×2×2×2×3×5×5×7

Exponential form of 8400 = $2^4 \times 3^1 \times 5^2 \times 7^1$

Home Work: Complete Exercise 4.1 in the Maths copy.