

Exponents

When a number is multiplied with itself a number of times, then it can be expressed as the number raised to the power of a natural number.

$$5^2 = 5 \times 5 = 25$$

$$5 \times 5 \times 5 \times 5 = 5^4 \quad \begin{array}{l} \text{and } 4 \\ \text{Base} \end{array}$$

↳ 4 times

$$a \times a \times a \times a \times a = a^5 \quad \begin{array}{l} \text{index} \\ \text{Base} \end{array}$$

a — Base

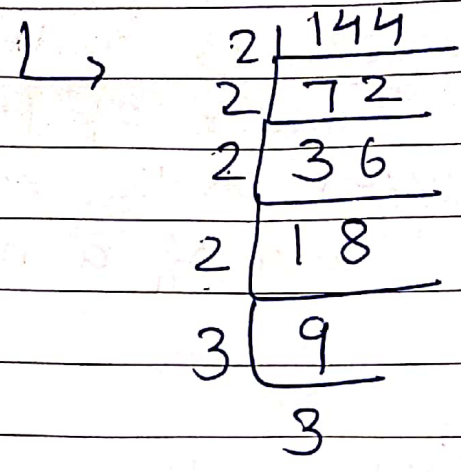
5 is called the exponent power or index.

⇒ Quantity that represents the power to which a given number is to be raised.

A number as a product of power of prime factor.

prime factor: That factor which cannot factorize further.

→ $144 = \text{prime factor} \times \text{prime factor}$



$$144 = 2^4 \times 3^2$$

Q 8 729 ~~prime factor~~ number into exponential notation

$$729 = 3^6$$

→ Laws of Exponents

- $a^m \times a^n = a^{m+n}$
- $a^m \div a^n = a^{m-n}$
- $a^m = a^m$ } Same base to the mth power $(a^m)^n$
- $a^m \times b^m = (ab)^m$
- $a^m \div b^m = (a/b)^m$
- $a^0 = 1$ } Diff base → a · b
- $-1^0 = 1$ } Same exp - m

$$-1^1 = -1$$

$$-1^2 = -1 \times -1 = 1$$

powers of the same base

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$(i) \quad 2b^6 \cdot b^3 \cdot 5b^4$$

$$2 \times 5 \times b^{6+3+4}$$

$$= 10b^{13}$$

$$(ii) \quad n^2y^3 \cdot 6n^5y \cdot 9n^3y^4$$

$$6 \times 9 \cdot n^{2+5+3} \cdot y^{3+1+4}$$

$$= 54n^{10}y^8$$

$$(iii) \quad (-a)^5 (a^2)$$

$$= (-1 \times a^5) (-1 \times a^5) \times a^2$$

$$= (-1) \times a^{5+2} = -a^7$$

Q. If $m = -2$ and $n = 2$
find the value of
 $m + n^2 - 2mn$

$$\underline{\underline{m = -2}}$$

$$= m^2 + n^2 - 2mn$$

$$= m = -2, n = 2$$

$$= (-2)^2 + (2)^2 - 2(-2)(2)$$

$$= 4 + 4 - (-8)$$

$$= 8 + 8$$

$$= 16 = (2^4)$$

$$Q. \frac{(7p^2q^3r^5)^2 (4pqr)^3}{(14p^6q^{10}r^4)^2}$$

$$\left(7^2 p^{2 \times 2} q^{3 \times 2} r^{5 \times 2} \right) \left(4^3 p^3 q^3 r^3 \right)$$

$$\left(14^2 p^{6 \times 2} q^{10 \times 2} r^{4 \times 2} \right)$$

$$\frac{(7x \sqrt{p^4 q^8} y^{10}) (4x \sqrt[2]{p^3 q^3} y^3)}{2x \sqrt{p^4} y^{12} \sqrt[2]{p^{12} q^{20} y^8}}$$

$$\frac{2x \sqrt{p^4} y^{12} \sqrt[2]{p^{12} q^{20} y^8}}{2x \sqrt{p^4} y^{12} \sqrt[2]{p^{12} q^{20} y^8}}$$

$$= p^{4-12+3} q^{8-20} y^{10+3-8}$$

$$= 16 p^{-5} q^{-12} y^5$$

$$= \frac{16q^8}{p^5} \text{ Am}$$

Home work.

- 5A :
- | | |
|-----------|---------|
| 1. (v) | 8. (ii) |
| 2. (viii) | 9. |
| 3. (iii) | 10. |
| 4. (iii) | |
| 5. (iv) | |
| 6. (v) | |
| 7. (iv) | |

5B.

↳ All last
one.

Q3.

(x xi)

Q8