



Chapter 6 Exponents

6. Exponents Exercise - 6.1 VII

Solution - 01.

$$(i) 13^2 = 13 \times 13 = 169$$

$$(ii) 7^3 = 7 \times 7 \times 7 = 49 \times 7 = 343$$

$$(iii) 3^4 = 3 \times 3 \times 3 \times 3 = 3 \times 3 \times 9 = 9 \times 9 = 81$$

Solution - 02.

$$(i) (-7)^2 = (-7) \times (-7) = +49$$

$$\begin{aligned}(ii) (-3)^4 &= (-3) \times (-3) \times (-3) \times (-3) \\ &= (9) \times (9) \\ &= 81\end{aligned}$$

$$\begin{aligned}(iii) (-5)^5 &= (-5) \times (-5) \times (-5) \times (-5) \times (-5) \\ &= 25 \times 25 \times -5 \\ &= 625 \times -5 \\ &= -3125\end{aligned}$$

Solution - 03 :-

$$\begin{aligned}(i) 3 \times 10^2 &= 3 \times 10 \times 10 \\ &= 300\end{aligned}$$

$$\begin{aligned}(ii) 2^2 \times 5^3 &= 2 \times 2 \times 5 \times 5 \times 5 \\ &= 4 \times 25 \times 5 \\ &= 500\end{aligned}$$

$$\begin{aligned}(iii) 3^3 \times 5^2 &= 3 \times 9 \times 25 \\ &= 675\end{aligned}$$

(XV)



Solution-04.

$$\begin{aligned}(i) 3^2 \times 10^4 &= 9 \times 100 \times 100 \quad [\because 3 \times 3 \times 10 \times 10 \times 10 \times 10 = 3^2 \times 10^2 \times 10^2] \\ &= 9 \times 10000 \\ &= 90000\end{aligned}$$

$$\begin{aligned}(5) (ii) (-3)^2 \times (-5)^3 &= 9 \times -5 \times -5 \times -5 \\ &= -9 \times 25 \times 5 \\ &= -9 \times 125 \\ &= -1125.\end{aligned}$$

$$\begin{aligned}(i) (-2) \times (-3)^3 &= -2 \times -3 \times -3 \times -3 \\ &= 6 \times 9 \\ &= 54\end{aligned}$$

$$\begin{aligned}(iii) (-2)^5 \times (-10)^2 &= -2 \times -2 \times -2 \times -2 \times -2 \times -10 \times -10 \\ &= -32 \times 100 \\ &= -3200.\end{aligned}$$

Solution-04.

$$\begin{aligned}(ii) 2^4 \times 3^2 &= 2 \times 2 \times 2 \times 2 \times 3 \times 3 \\ &= 8 \times 2 \times 9 \\ &= 8 \times 18 \\ &= 144.\end{aligned}$$

$$\begin{aligned}(iii) 5^2 \times 3^4 &= 5 \times 5 \times 3 \times 3 \times 3 \times 3 \\ &= 25 \times 9 \times 9 \\ &= 25 \times 81 \\ &= 2025 \\ &= 2025.\end{aligned}$$



Solution - 06:-

$$(i) \left(\frac{3}{4}\right)^2 = \frac{3}{4} \times \frac{3}{4} = \frac{3 \times 3}{4 \times 4} = \frac{9}{16}$$

$$(ii) \left(\frac{-2}{3}\right)^4 = \frac{(-2) \times (-2) \times (-2) \times (-2)}{3 \times 3 \times 3 \times 3}$$

$$= \frac{4 \times 4}{9 \times 9}$$

$$= \frac{16}{81}$$

$$(iii) 3^5 \text{ or } \left(\frac{-4}{5}\right)^5 = \frac{(-4)(-4)(-4)(-4)(-4)}{5 \times 5 \times 5 \times 5 \times 5}$$

$$= - \frac{[16 \times 16 \times 4]}{25 \times 25 \times 5}$$

$$= - \frac{1024}{3125}$$

Solution - 07:-

$$(i) 2^5 \text{ or } 5^2$$

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

$$= 32$$

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

$$= 25$$

$$2^5 > 5^2$$

$$(ii) 3^4 \text{ or } 4^3$$

$$3^4 = 3 \times 3 \times 3 \times 3$$

$$= 9 \times 9$$

$$= 81$$



(iii) 3^5 (or) 5^3

$$3^5 = 3 \times 3 \times 3 \times 3 \times 3$$

$$= 9 \times 9 \times 3$$

$$= 81 \times 3$$

$$= 243$$

$$5^3 = 5 \times 5 \times 5$$

$$= 25 \times 5$$

$$= 125$$

Solution-08:

$$(i) (-5) \times (-5) \times (-5) = -125 \times (-5)$$

$$= -125$$

$$= (-5)^3$$

$$(ii) -\frac{5}{7} \times -\frac{5}{7} \times -\frac{5}{7} \times -\frac{5}{7} = \left(-\frac{5}{7}\right)^4$$

$$(iii) \frac{4}{3} \times \frac{4}{3} \times \frac{4}{3} \times \frac{4}{3} \times \frac{4}{3} = \left(\frac{4}{3}\right)^5$$

Solution-09:-

$$(i) x \times x \times x \times x \times x \times a \times a \times b \times b \times b = x^4 \times a^2 \times b^3$$

$$= x^4 a^2 b^3$$

$$(ii) (-2) \times (-2) \times (-2) \times (-2) \times a \times a \times a = (-2)^4 \times a^3$$

$$(iii) \left(-\frac{2}{3}\right) \times \left(-\frac{2}{3}\right) \times \left(-\frac{2}{3}\right) \times x \times x \times x = \left(-\frac{2}{3}\right)^3 \times x^3$$

$$= \left(-\frac{2}{3}\right)^3 \times x^3$$



Solution-10.

(i) 512.

we have,

$$512 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$= 2^9$$

$$\begin{array}{r} 2 \overline{) 512} \\ 2 \overline{) 256} \\ 2 \overline{) 128} \\ 2 \overline{) 64} \\ 2 \overline{) 32} \\ 2 \overline{) 16} \\ 2 \overline{) 8} \\ 2 \overline{) 4} \\ 2 \end{array}$$

(ii) $625 = 5 \times 5 \times 5 \times 5$

$$= 25 \times 25$$

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

$$= 5^4$$

$$\begin{array}{r} 5 \overline{) 625} \\ 5 \overline{) 125} \\ 5 \overline{) 25} \\ 5 \end{array}$$

(iii) 729

we have,

$$729 = 3 \times 3 \times 3 \times 3 \times 3 \times 3$$

$$= 3^3 \times 3^3$$

$$= 3^6$$

Solution-11:

(i) 36

using prime factorisation of 36, we have

$$36 = 2 \times 2 \times 3 \times 3$$

$$= 2^2 \times 3^2$$

$$\begin{array}{r} 2 \overline{) 36} \\ 2 \overline{) 18} \\ 3 \overline{) 9} \\ 3 \end{array}$$

(ii) using prime factorisation of 675, we have.

$$675 = 5 \times 5 \times 3 \times 3 \times 3 \times 3$$

$$= 3^3 \times 5^2$$

$$= 5^2 \times 3^3$$

$$\begin{array}{r} 3 \overline{) 675} \\ 3 \overline{) 225} \\ 5 \overline{) 75} \\ 5 \overline{) 15} \\ 3 \end{array}$$



$$(ii) 392 = 2 \times 2 \times 2 \times 7 \times 7$$

$$= 2^3 \times 7^2$$

$$\begin{array}{r} 2 \overline{) 392} \\ \underline{2 196} \\ 2 98 \\ \underline{2 98} \\ 7 49 \\ \underline{7 49} \\ 0 \end{array}$$

Solution-12

$$(i) 450 = 2 \times 3^2 \times 5^2$$

$$= 2 \times 3^2 \times 5^2$$

$$\begin{array}{r} 2 \overline{) 450} \\ \underline{2 225} \\ 5 75 \\ \underline{5 75} \\ 5 15 \\ \underline{5 15} \\ 0 \end{array}$$

$$(ii) 2800$$

Using prime factorisation of 2800, we have

$$2800 = 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 7$$

$$= 2^4 \times 5^2 \times 7$$

$$\begin{array}{r} 2 \overline{) 2800} \\ \underline{2 1400} \\ 7 700 \\ \underline{7 700} \\ 2 100 \\ \underline{2 100} \\ 2 50 \\ \underline{2 50} \\ 5 25 \\ \underline{5 25} \\ 0 \end{array}$$

(iii) Using prime factorisation of 24000, we have

$$24000 = 2 \times 12000$$

$$= 2 \times 6 \times 2000$$

$$= 2 \times 2 \times 3 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5$$

$$= 2^6 \times 3^1 \times 5^3$$

$$\begin{array}{r} 2 \overline{) 24000} \\ \underline{2 12000} \\ 2 6000 \\ \underline{2 6000} \\ 2 3000 \\ \underline{2 3000} \\ 2 1500 \\ \underline{2 1500} \\ 2 750 \\ \underline{2 750} \\ 5 375 \\ \underline{5 375} \\ 5 75 \\ \underline{5 75} \\ 3 15 \\ \underline{3 15} \\ 0 \end{array}$$

Solution -13:-

$$(i) \left(\frac{3}{7}\right)^2 = \frac{9}{49}$$

$$(ii) \left(\frac{7}{9}\right)^3 = \left(\frac{7}{9}\right) \times \left(\frac{7}{9}\right) \times \left(\frac{7}{9}\right)$$

$$= \frac{(7) \times (7) \times (7)}{9 \times 9 \times 9}$$

$$= \frac{343}{729}$$



$$\begin{aligned}
 \text{(ii)} \quad \left(-\frac{2}{3}\right)^4 &= \left(-\frac{2}{3}\right)\left(-\frac{2}{3}\right)\left(-\frac{2}{3}\right)\left(-\frac{2}{3}\right) \\
 &= \frac{(-2)(-2)(-2)(-2)}{3 \times 3 \times 3 \times 3} \\
 &= \frac{16}{81}
 \end{aligned}$$

Solution-14:-

$$\text{(i)} \quad \frac{49}{64} = \left(\frac{7}{8}\right)^2$$

$$\begin{aligned}
 \text{(ii)} \quad -\frac{64}{125} &= \frac{-4 \times 4 \times 4}{5 \times 5 \times 5} \\
 &= \left(-\frac{4}{5}\right)^3
 \end{aligned}$$

$$\begin{aligned}
 \text{(iii)} \quad -\frac{1}{216} &= \frac{-1}{6 \times 6 \times 6} \\
 &= \left(-\frac{1}{6}\right)^3
 \end{aligned}$$

Solution-15:-

$$\begin{aligned}
 \text{(i)} \quad \left(-\frac{1}{2}\right)^2 \times 2^3 \times \left(\frac{3}{4}\right)^2 &= \left(\frac{1}{4}\right) \times (8) \times \frac{9}{16} \\
 &= \frac{9}{8}
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii)} \quad \left(-\frac{3}{5}\right)^4 \times \left(\frac{4}{9}\right)^4 \times \left(-\frac{15}{18}\right)^2 &= \left(\frac{81}{625}\right) \times \left(\frac{256}{81 \times 81}\right) \times \left(\frac{225}{18 \times 18}\right) \\
 &= \frac{64}{18225}
 \end{aligned}$$



Solution - 16:-

Given that,

$$a = 2, b = 3$$

$$\begin{aligned} \text{(i)} \quad (a+b)^2 &= (2+3)^2 \\ &= 5^2 \\ &= 25. \end{aligned}$$

$$\begin{aligned} \text{(ii)} \quad (ab)^3 &= (2 \times 3)^3 \\ &= 6^3 \\ &= 216. \end{aligned}$$

$$\begin{aligned} \text{(iii)} \quad \left(\frac{b}{a}\right)^3 &= \left(\frac{3}{2}\right)^3 \\ &= \frac{3 \times 3 \times 3}{2 \times 2 \times 2} \\ &= \frac{27}{8}. \end{aligned}$$

$$\begin{aligned} \text{(iv)} \quad \left(\frac{a}{b} + \frac{b}{a}\right)^2 &= \left(\frac{2}{3} + \frac{3}{2}\right)^2 \\ &= \left(\frac{4+9}{6}\right)^2 \\ &= \left(\frac{13}{6}\right)^2 \\ &= \frac{169}{36}. \end{aligned}$$



Exercise - 6.2.

Solution - 01.

$$(i) 2^4 \times 2^3 \times 2^5 = 2^{4+3+5}$$

$$[\because a^m \times a^n \times a^p = a^{m+n+p}, \text{ where}$$

$$m=4, n=3, p=5]$$

$$= 2^{12}$$

$$(ii) \frac{5^{12}}{5^3} = 5^{12-3} \quad [\because \frac{a^m}{a^n} = a^{m-n}]$$

$$= 5^9$$

$$(iii) (7^2)^3 = (7)^6 \quad [\because (a^b)^c = a^{bc}]$$

$$(iv) (3^2)^5 \div 3^4 = \frac{(3^2)^5}{3^4}$$

$$= \frac{3^{10}}{3^4} \quad [\because (a^m)^n = a^{m \times n}]$$

$$= 3^{10-4}$$

$$= 3^6 \quad [\because \frac{a^m}{a^n} = a^{m-n}]$$

$$(v) 3^7 \times 2^7 = (3 \times 2)^7 \quad [\because a^n \times b^n = (ab)^n]$$

$$= 6^7$$

$$(vi) (5^{21} \div 5^{13}) \times 5^7 = \frac{5^{21}}{5^{13}} \times 5^7$$

$$= 5^{21-13} \times 5^7 \quad [\because \frac{a^m}{a^n} = a^{m-n}]$$

$$= 5^8 \times 5^7$$

$$= 5^{8+7} = 5^{15} \quad [\because 5^a \times 5^b = 5^{a+b}]$$



Solution -02 :-

$$(i) \{ (2^3)^4 \times 2^8 \} \div 2^{12} = \frac{2^{12} \times 2^8}{2^{12}}$$
$$= 2^8$$

$$(ii) (8^2 \times 8^4) \div 8^3 = \frac{8^{2+4}}{8^3}$$
$$= \frac{8^6}{8^3}$$
$$= 8^{6-3}$$
$$= 8^3 = 2^9$$

$$(iii) \left(\frac{5^7}{5^2}\right) \times 5^3 = 5^{7-2} \times 5^3$$
$$= 5^5 \times 5^3$$
$$= 5^8$$

$$(3) (iv) \left(\frac{2}{3}\right)^5 \times \left(\frac{3}{5}\right)^5 = \left(\frac{2^5}{3^5} \times \frac{3^5}{5^5}\right)$$
$$= \frac{32}{5^5}$$
$$= \frac{2^5}{5^5}$$
$$= \left(\frac{2}{5}\right)^5$$



Solution-04:-

$$\begin{aligned} 9 \times 9 \times 9 \times 9 \times 9 &= 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \\ &= 3^2 \times 3^2 \times 3^2 \times 3^2 \times 3^2 \\ &= 3^{10} \end{aligned}$$

Solution-05:-

$$\begin{aligned} \text{(i)} \quad \frac{25^3}{5^3} &= \frac{(5^2)^3}{5^3} \\ &= \frac{5^2 \times 5^2 \times 5^2}{5^3} \\ &= \frac{5^6}{5^3} \\ &= 5^{6-3} \\ &= 25 \end{aligned}$$

$$\begin{aligned} \text{(ii)} \quad \frac{(81)^5}{(3^2)^5} &= \frac{(3^4)^5}{(3^2)^5} \\ &= \frac{3^{20}}{3^{10}} \end{aligned}$$

$$\begin{aligned} &= 3^{20-10} \\ &= 3^{10} \end{aligned}$$

$$\begin{aligned} \text{(iii)} \quad \frac{9^8 \times (x^2)^5}{(27)^4 \times (x^3)^2} &= \frac{3^8 \times x^{10}}{(3^3)^4 \times x^6} \\ &= \frac{3^{16}}{3^{12}} x^4 = (3x)^4 \end{aligned}$$



$$\begin{aligned} \textcircled{1v} \quad \frac{3^2 \times 7^8 \times 13^6}{21^2 \times 91^3} &= \frac{\cancel{3^2} \times 7^8 \times 13^6}{\cancel{3^2} \times 7^2 \times 91^3} \\ &= \frac{7^{8-2} \times 13^6}{13^3 \times 7^3} \\ &= \frac{7^3 \times 13^3}{13^3 \times 7^3} \\ &= (91)^3 \end{aligned}$$

$$\begin{aligned} \textcircled{2} \textcircled{iv} \quad \frac{5^4 \times x^{10} y^5}{5^4 \times x^7 y^4} &= x^{10-7} \cdot y^{5-4} \\ &= x^3 \cdot y^1 \end{aligned}$$

$$\begin{aligned} \textcircled{3} \textcircled{i} \quad \{ (3^2)^3 \times 2^6 \} \times 5^6 &= \{ 3^6 \times 2^6 \} \times 5^6 \\ &= \{ 3 \times 2 \times 5 \}^6 \\ &= 30^6 \end{aligned}$$

$$\begin{aligned} \textcircled{ii} \quad (8^2 \times 8^4) \div 8^3 &= \frac{8^6}{8^3} \\ &= 8^{6-3} \\ &= 8^3 \\ &= (2^3)^3 \\ &= 2^9 \end{aligned}$$



$$\begin{aligned}
 3. \text{ii)} \quad \frac{x^{12}}{y^{12}} \times y^{24} \times 2^{12} &= x^{12} \cdot y^{24-12} \cdot 2^{12} \\
 &= x^{12} \cdot y^{12} \cdot 2^{12} \\
 &= (2xy)^{12}
 \end{aligned}$$

$$\begin{aligned}
 \text{iii)} \quad \left(\frac{5}{2}\right)^6 \times \left(\frac{5}{2}\right)^2 &= \frac{5^6}{2^6} \times \frac{5^2}{2^2} \\
 &= \frac{5^{6+2}}{2^{6+2}} \\
 &= \frac{5^8}{2^8}
 \end{aligned}$$

Solution - 06:-

$$\begin{aligned}
 \text{(i)} \quad (3^5)^{11} \times (3^5)^4 - (3^5)^8 \times (3^5)^5 \\
 &= 3^{55} \times 3^{60} - 3^{90} \times 3^{25} \\
 &= 3^{55+60} - 3^{90+25} \\
 &= 3^{115} - 3^{115} \\
 &= 0
 \end{aligned}$$

$$\begin{aligned}
 \text{ii)} \quad \frac{16 \times 2^{n+1} - 4 \times 2^n}{16 \times 2^{n+2} - 2 \times 2^{n+2}} \\
 &= \frac{16 \times 2^n \cdot 2^1 - 4 \cdot 2^n}{16 \cdot 2^2 \cdot 2^n - 2 \cdot 2^2 \cdot 2^n} = \frac{2^n [32 - 4]}{2^n [64 - 8]} \\
 &= \frac{1}{2}
 \end{aligned}$$



6.

$$\begin{aligned} \textcircled{iii} \quad & \frac{10 \times 5^{n+1} + 25 \times 5^n}{3 \times 5^{n+2} + 10 \times 5^{n+1}} \\ &= \frac{5^n [10 \cdot 5 + 25]}{5^n [3 \times 5^2 + 10 \times 5]} \\ &= \frac{75}{125} \\ &= \frac{3}{5} \end{aligned}$$

$$\begin{aligned} \textcircled{iv} \quad & \frac{16^7 \times (25)^5 \times (81)^3}{15^7 \times 24^5 \times 80^3} \\ &= \left(\frac{16}{15}\right)^7 \times \left(\frac{25}{24}\right)^5 \times \left(\frac{81}{80}\right)^3 \\ &= \frac{4^7 \cdot 4^7}{5^7 \cdot 3^7} \times \frac{5^9 \cdot 5^5}{6^5 \cdot 4^5} \times \frac{3^3 \cdot 3^3 \cdot 9^3}{4^3 \cdot 2^3 \cdot 4^3} \\ &= \frac{4^3 \cdot 3 \cdot 9^3}{6^5} = \frac{4^2 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3}{2^5 \cdot 3 \cdot 2^5} \\ &= 2. \end{aligned}$$



Solution n-07.

$$(i) 5^{2n} \times 5^3 = 5^{11}$$

Bases are equal, Then powers should be added

$$2n + 3 = 11$$

$$2n = 11 - 3$$

$$n = \frac{8}{2}$$

$$n = 4$$

$$(ii) 9 \times 3^n = 3^7$$

$$3^2 \times 3^n = 3^7$$

$$3^{2+n} = 3^7$$

$$2 + n = 7$$

$$n = 7 - 2$$

$$n = 5$$

$$(iii) 8 \times 2^{n+2} = 32$$

$$2^3 \times 2^{n+2} = 32$$

$$2^{n+5} = 32 = 2^5$$

$$n + 5 = 5$$

$$n = 5 - 5$$

$$n = 0$$



$$\textcircled{iv} \quad 7^{2n+1} \div 49 = 7^3$$

$$\frac{7^{2n+1}}{7^2} = 7^3$$

$$7^{2n+1-2} = 7^3$$

$$2n-1 = 3$$

$$2n = 3+1$$

$$2n = 4$$

$$n = 2$$

$$\textcircled{v} \quad \left(\frac{3}{2}\right)^4 \times \left(\frac{3}{2}\right)^5 = \left(\frac{3}{2}\right)^{2n+1}$$

$$\left(\frac{3}{2}\right)^{4+5} = \left(\frac{3}{2}\right)^{2n+1}$$

$$9 = 2n+1$$

$$\Rightarrow 2n = 9-1$$

$$\Rightarrow 2n = 8$$

$$\Rightarrow n = \frac{8}{2}$$

$$\Rightarrow n = 4$$

$$\textcircled{vi} \quad \left(\frac{2}{3}\right)^{10} + \left\{\left(\frac{3}{2}\right)^3\right\}^5 = \left\{\frac{2}{3}\right\}^{2n-2}$$

$$\Rightarrow \frac{2^{10}}{3^{10}} + \frac{3^{10}}{2^{10}} = \left(\frac{2}{3}\right)^{2n-2}$$

$$\Rightarrow \frac{2^{20} + 3^{20}}{2^{10} \cdot 3^{10}} = \left(\frac{2}{3}\right)^{2n-2}$$



$$\Rightarrow \frac{2^{20} + 3^{20}}{2^8 \cdot 2^{10} \times 3^{10}} \times \frac{2^2}{5^2} = \frac{2^{2n}}{5^{2n}}$$

$$\Rightarrow \frac{2^{20} + 3^{20}}{2^8 \cdot 5^2 \cdot 3^{10}} = \frac{2^{2n}}{5^{2n}} \Rightarrow \frac{2^{20}}{2^8 \cdot 5^2 \cdot 3^{10}} + \frac{3^{20}}{2^8 \cdot 5^2 \cdot 3^{10}} = \frac{2^{2n}}{5^{2n}}$$

$$\Rightarrow \frac{2^{12}}{5^2 \times 3^{10}} + \frac{3^{10}}{2^8 \times 25} = \frac{2^{2n}}{5^{2n}}$$

→ Question is wrong.

Solution -08 :-

$$\frac{9^n \times 3^2 \times 3^n - (27)^n}{(3^3)^5 \times 2^3} = \frac{1}{27}$$

$$\Rightarrow \frac{3^{2n+2+n} - 3^{3n}}{3^{15} \times 2^3} = \frac{1}{27}$$

$$\Rightarrow 3^{2n+2+n} - 3^{3n} = 3^{12} \times 2^3$$

$$\Rightarrow 3^{3n+2} - 3^{3n} = 3^{12} \times 2^3$$

$$\Rightarrow 3^{3n} [3^2 - 1] = 3^{12} \times 2^3$$

$$\Rightarrow 3^{3n} \times 8 = 3^{12} \times 8$$

$$\Rightarrow 3^{3n} = 3^{12}$$

$$2n = 12$$

$$n = \frac{12}{2}$$

$$\boxed{n = 6}$$



$$\textcircled{vi} \quad \frac{2^4}{3^4} * \frac{(3^4)^5}{(2^4)^5} = \left(\frac{2}{3}\right)^{2n-2}$$

$$\Rightarrow 1 = \left(\frac{2}{3}\right)^{2n-2}$$

$$\Rightarrow \left(\frac{2}{3}\right)^0 = \left(\frac{2}{3}\right)^{2n-2} \quad [\because a^0 = 1]$$

$$\Rightarrow 2n - 2 = 0$$

$$\Rightarrow 2n = 2$$

$$\Rightarrow n = 1$$





Exercise- 6.3.

1. (i) 3908.78

we have,

3908.78

clearly, the decimal point is moved through ^{three} five places to obtain a number in which there is must one digit to the left of the decimal point

$$\therefore 3908.78 = 3.90878 \times 10^3$$

$$(ii) \quad 5,00,000,000 = 5.0000000 \times 10^7 \\ = 5 \times 10^7$$

(iii) we have,

$$3,18,65,00,000 = 3.1865000000000 \times 10^9 \\ = 3.1865 \times 10^9$$

$$(iv) \quad 846 \times 10^7 = 8.46 \times 10^2 \times 10^7 \\ = 8.46 \times 10^{2+7} \\ = 8.46 \times 10^9$$



Solution-02:-

$$\begin{aligned} \text{(i)} \quad 4.83 \times 10^7 &= \frac{483 \times 10^7}{10^2} \\ &= 4,83,00,000 \end{aligned}$$

$$\text{(ii)} \quad 3.21 \times 10^5 = 3,21,000$$

$$\text{(iii)} \quad 3.5 \times 10^3 = 3,500$$

Solution-02:-

$$\text{(i)} \quad 3,384,000,000 = 3.384 \times 10^9 \text{ m}$$

$$\text{(ii)} \quad 1,27,56,000 = 1.2756 \times 10^7 \text{ m}$$

$$\text{(iii)} \quad 1,400,000,000 = 1.4 \times 10^9 \text{ m}$$

$$\text{(iv)} \quad 12,000,000,000 = 1.2 \times 10^{10} \text{ years old}$$

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Exercise - 6.4

1> (i) We know that a number can be written as the sum of the place values of all digits of the numbers.

$$200068 = 2 \times 10000 + 0 \times 10^3 + 0 \times 100 + 6 \times 10^1 + 8 \times 10^0$$

$$= 2 \times 10^4 + 0 \times 10^3 + 0 \times 10^2 + 6 \times 10^1 + 8 \times 10^0$$

$$(ii) 420719 = 4 \times 10^5 + 2 \times 10^4 + 0 \times 10^3 + 7 \times 10^2 + 1 \times 10^1 + 9 \times 10^0$$

$$(iii) 7805192 = 7 \times 10^6 + 8 \times 10^5 + 0 \times 10^4 + 5 \times 10^3 + 1 \times 10^2 + 9 \times 10^1 + 2 \times 10^0$$

$$(iv) 5004132 = 5 \times 10^6 + 0 \times 10^5 + 0 \times 10^4 + 4 \times 10^3 + 1 \times 10^2 + 3 \times 10^1 + 2 \times 10^0$$

$$(v) 927303 = 9 \times 10^5 + 2 \times 10^4 + 7 \times 10^3 + 3 \times 10^2 + 0 \times 10^1 + 3 \times 10^0$$



Solution -02.

$$(i) 7 \times 10^4 + 6 \times 10^3 + 0 \times 10^2 + 4 \times 10^1 + 5 \times 10^0 = 76045$$

$$(ii) 5 \times 10^5 + 4 \times 10^4 + 2 \times 10^3 + 3 \times 10^0 = 542003$$

$$(iii) 9 \times 10^5 + 5 \times 10^2 + 3 \times 10^1 = 900530$$

$$(iv) 3 \times 10^4 + 4 \times 10^2 + 5 \times 10^0 = 30405$$



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