



SpeedLabs

MATHS

ICSE 8th

TEEVRA EDUTECH PVT. LTD.

1. Simplify:

(i) $\frac{m^5 n^3}{m^2 n^{-4}}$

Ans. $\frac{m^5 n^3}{m^2 n^{-4}} = m^3 n^7$

(ii) $x^6 y^4 z^{-2} \times x^{-3} y^{-5} z^{-1} \times x^2 y^0 z^4$

Ans. $x^6 y^4 z^{-2} \times x^{-3} y^{-5} z^{-1} \times x^2 y^0 z^4 = x^5 y^{-1} z^1$

2. Evaluate:

(i) $(27)^{2/3}$

Ans. $(27)^{2/3} = (3^3)^{2/3} = 9$

(ii) $(32)^{-4/5}$

Ans. $(32)^{-4/5} = (2^5)^{-4/5} = \frac{1}{16}$

3. Simplify:

(i) $(64m^{-6}n^3)^{2/3}$

Ans. $(64m^{-6}n^3)^{2/3} = (4^3 m^{-6} n^3)^{2/3} = 16m^{-4}n^2$

(ii) $\sqrt[3]{x^{18}y^{-12}z^3}$

Ans. $\sqrt[3]{x^{18}y^{-12}z^3} = (x^{18}y^{-12}z^3)^{1/3} = x^6y^{-4}z$

4. Show that:

(i) $\frac{x^{m+n} x^{n+l} x^{l+m}}{(x^m x^n x^l)^2} = 1$

Ans. $\frac{x^{m+n} x^{n+l} x^{l+m}}{(x^m x^n x^l)^2} = 1$

$$\frac{x^{2m+2n+2l}}{(x^m x^n x^l)^2} = 1$$

$$\frac{x^{2m} x^{2n} x^{2l}}{(x^m x^n x^l)^2} = 1$$

$$\frac{(x^m x^n x^l)^2}{(x^m x^n x^l)^2} = 1$$

(ii) $\sqrt{x^{p-q}} \sqrt{x^{q-r}} \sqrt{x^{r-p}} = 1$

Ans. $\sqrt{x^{p-q}} \sqrt{x^{q-r}} \sqrt{x^{r-p}} = 1$

$$(x^{p-q+q-r+r-p})^{1/2} = x^{0/2} = x^0 = 1$$

$$\left(\frac{x^p}{x^q}\right)^r \times \left(\frac{x^q}{x^r}\right)^p \times \left(\frac{x^r}{x^p}\right)^q = 1$$

$$(x^{p-q})^r (x^{q-r})^p (x^{r-p})^q = 1$$

$$x^{pr-qr+pq-rp+rq-pq} = 1$$

$$x^0 = 1$$

5. Evaluate

(i) $\left(\frac{x^a}{x^b}\right)^{\frac{1}{ab}} \times \left(\frac{x^b}{x^c}\right)^{\frac{1}{bc}} \times \left(\frac{x^c}{x^a}\right)^{\frac{1}{ca}}$

Ans. $\left(\frac{x^a}{x^b}\right)^{\frac{1}{ab}} \times \left(\frac{x^b}{x^c}\right)^{\frac{1}{bc}} \times \left(\frac{x^c}{x^a}\right)^{\frac{1}{ca}}$

$$= x^{\frac{a-b}{ab}} x^{\frac{b-c}{bc}} x^{\frac{c-a}{ca}}$$

$$= x^{\frac{1}{b} - \frac{1}{a} + \frac{1}{c} - \frac{1}{b} + \frac{1}{a} - \frac{1}{c}}$$

$$= x^0 = 1$$

$$(ii) \quad \frac{1}{1+x^{a-b}} + \frac{1}{1+x^{b-a}}$$

$$\text{Ans.} \quad \frac{1}{1+x^{a-b}} + \frac{1}{1+x^{b-a}}$$

$$= \frac{(1+x^{a-b}) + (1+x^{b-a})}{(1+x^{a-b})(1+x^{b-a})}$$

$$= \frac{2+x^{a-b} + x^{b-a}}{1+x^{a-b} + x^{b-a} + x^{a-b}x^{b-a}}$$

$$= x^0 = 1$$

$$6. \quad \text{Simplify: } \frac{a^{7+2n} \cdot (a^2)^{3n+2}}{(a^4)^{2n+3}}$$

$$\text{Ans.} \quad \frac{a^{7+2n} \cdot (a^2)^{3n+2}}{(a^4)^{2n+3}}$$

$$= \frac{a^{7+2n+6n+4}}{a^{8n+12}}$$

$$= a^{7+2n+6n+4-8n-12}$$

$$= a^{-1} = \frac{1}{a}$$

7. Evaluate:

$$(i) \quad (64)^{2/3} + \sqrt[3]{125} + 3^0 + \frac{1}{2^{-5}} + 27^{-2/3} \times \left(\frac{25}{9}\right)^{-1/2}$$

$$\text{Ans.} \quad (64)^{2/3} + \sqrt[3]{125} + 3^0 + \frac{1}{2^{-5}} + 27^{-2/3} \times \left(\frac{25}{9}\right)^{-1/2}$$

$$= 16 + 5 + 1 + 32 + 3^{-2} \times \frac{3}{5} = 54 \frac{1}{15}$$

$$(ii) \quad 81^{-1} \times 3^{-5} \times 3^9 \times 64^{5/6} \times (\sqrt[3]{3})^6$$

$$\text{Ans.} \quad 81^{-1} \times 3^{-5} \times 3^9 \times 64^{5/6} \times (\sqrt[3]{3})^6$$

$$= 3^{-4-5+9} 4^{5/2} \times 3^2 = 288$$

8. Find the value of x when:

(i) $\left(\frac{-3}{11}\right)^{x+5} \div \left(\frac{-3}{11}\right)^{-2x+3}$

Ans. $\left(\frac{-3}{11}\right)^{x+5} \div \left(\frac{-3}{11}\right)^{-2x+3} = \left(\frac{-3}{11}\right)^{2x-5} \times \left[\left(\frac{-3}{11}\right)^{-2}\right]^{(x+4)}$

$$\left(\frac{-3}{11}\right)^{x+5+2x-3} = \left(\frac{-3}{11}\right)^{2x-5-2(x+4)}$$

Therefore $x+5+2x-3=2x-5-2x-8$ or $x=-5$

(ii) $\left[\left\{\left(\frac{2}{5}\right)^2\right\}^4\right]^{x+2} = \left[\left\{\left(\frac{2}{5}\right)^{-2}\right\}^{(x-1)}\right]^{-3}$

Ans. $\left[\left\{\left(\frac{2}{5}\right)^2\right\}^4\right]^{x+2} = \left[\left\{\left(\frac{2}{5}\right)^{-2}\right\}^{(x-1)}\right]^{-3}$

$$2 \times 4 \times (x+2) = -2 \times (x-1) \times (-3)$$

$$8x + 16 = 6x - 6 \text{ or } x = -11$$

9. Show that:

(i) $\left(\frac{x^a}{x^{-b}}\right)^{a-b} \times \left(\frac{x^b}{x^{-c}}\right)^{b-c} \times \left(\frac{x^c}{x^{-a}}\right)^{c-a} = 1$

Ans. $\left(\frac{x^a}{x^{-b}}\right)^{a-b} \times \left(\frac{x^b}{x^{-c}}\right)^{b-c} \times \left(\frac{x^c}{x^{-a}}\right)^{c-a} = 1$

$$\left(x^{a+b}\right)^{a-b} \times \left(x^{b+c}\right)^{b-c} \times \left(x^{c+a}\right)^{c-a} = 1$$

$$x^{a^2-b^2} x^{b^2-c^2} x^{c^2-a^2} = 1$$

$$x^0 = 1 \text{ Hence Proved}$$

$$(ii) \left(\frac{x^{a+b}}{x^c}\right)^{a-b} \times \left(\frac{x^{b+c}}{x^a}\right)^{b-c} \times \left(\frac{x^{c+a}}{x^b}\right)^{c-a} = 1$$

$$Ans. \left(\frac{x^{a+b}}{x^c}\right)^{a-b} \times \left(\frac{x^{b+c}}{x^a}\right)^{b-c} \times \left(\frac{x^{c+a}}{x^b}\right)^{c-a} = 1$$

$$(x^{a+b-c})^{a-b} \times (x^{b+c-a})^{b-c} \times (x^{c+a-b})^{c-a} = 1$$

$$x^{a^2+ab-ac-ab-b^2+bc+b^2+bc-ab-bc-c^2+ac+c^2+ac-bc-ac-a^2+ab} = 1$$

$x^0 = 1$ Hence Proved

10. Simplify:

$$(i) (32a^{10}b^{-5})^{1/5}$$

$$Ans. (32a^{10}b^{-5})^{1/5} = (2^5 a^{10} b^{-5})^{1/5} = 2a^2b^{-1}$$

$$(ii) (27x^{-3})^{1/3}$$

$$Ans. (27x^{-3})^{1/3} = (3^3 x^{-3})^{1/3} = \frac{3}{x}$$