Maths

Unit 4 Ex:4.2

Simplify by using the laws of exponent into the exponential form.

$(-4)^5 \times (-4)^6$

Sol:- $\because x^m \cdot x^n = x^{m+n}$

$= (-4)^5 \times (-4)^6$

$= (-4)^{5+6}$

$= (-4)^{11}$

$m^3 \times m^4$

Sol $= m^3 \times m^4$

$\because x^m \cdot x^n = x^{m+n}$

$= (m)^{3+4}$

$= (m)^7$

$\left(\frac{2}{7}\right)^3 \times \left(\frac{2}{7}\right)^2$

Sol $= \left(\frac{2}{7}\right)^3 \times \left(\frac{2}{7}\right)^2$

$\because x^m \cdot x^n = x^{m+n}$

$= \left(\frac{2}{7}\right)^{3+2}$

$= \left(\frac{2}{7}\right)^5$

$\left(\frac{1}{10}\right)^4 \times \left(\frac{1}{10}\right)^5$

Sol: $= \left(\frac{1}{10}\right)^4 \times \left(\frac{1}{10}\right)^5$

$\because x^m \cdot x^n = x^{m+n}$

$= \left(\frac{1}{10}\right)^{4+5}$

$= \left(\frac{1}{10}\right)^9$

$p^{10} \times q^{10}$

Sol $= p^{10} \times q^{10}$

$\because x^m \cdot y^m = (xy)^m$

$= (p \times q)^{10}$

$= (pq)^{10}$

$\left(\frac{2}{5}\right)^3 \times \left(\frac{5}{7}\right)^3$

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

$\because x^m \cdot y^m = (xy)^m$

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

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

$\left(\frac{-1}{2}\right)^6 \times \left(\frac{-1}{2}\right)^5$

$= \left(\frac{-1}{2}\right)^6 \times \left(\frac{-1}{2}\right)^5$

$\because x^m \cdot x^n = x^{m+n}$

$= \left(\frac{-1}{12}\right)^{6+5}$

$= \left(\frac{-1}{2}\right)^{11}$

$(-3)^7 \times (-5)^7$

$= (-3)^7 \times (-5)^7$

$\because x^m \cdot y^m = (xy)^m$

$= (-3 \times -5)^7$

$= (+15)^7$

$\left(\frac{2}{3}\right)^{10} \times \left(\frac{2}{3}\right)^7$

Sol $= \left(\frac{2}{3}\right)^{10} \times \left(\frac{2}{3}\right)^7$

$\because x^m \cdot x^n = x^{m+n}$

$= \left(\frac{2}{3}\right)^{10+7}$

$= \left(\frac{2}{3}\right)^{17}$

$\left(\frac{-10}{11}\right)^{7} \times \left(\frac{-10}{11}\right)^{6}$

Sol $= \left(\frac{-10}{11}\right)^{7} \times \left(\frac{-10}{11}\right)^{6}$

$= \because x^m \cdot x^n = x^{m+n}$

$= \left(\frac{-10}{11}\right)^{7+6}$

$= \left(\frac{-10}{11}\right)^{13}$

$\left(\frac{11}{7}\right)^{8} \times \left(\frac{21}{22}\right)^{8}$

Sol $= \left(\frac{11}{7}\right)^{8} \times \left(\frac{21}{22}\right)^{8}$

$\because x^m \cdot y^m = (xy)^m$

$$= \left(\frac{\cancel{11}}{\cancel{7}} \times \frac{\overset{3}{\cancel{21}}}{\cancel{22}}\right)^8$$

$$= \left(\frac{3}{2}\right)^8$$

$$\left(\frac{-x}{y}\right) \times \left(\frac{-x}{y}\right)^{11}$$

Sol $= \left(\frac{-x}{y}\right) \times \left(\frac{-x}{y}\right)^{11}$

$\because x^m \cdot x^n = x^{m+n}$

$= \left(\frac{-x}{y}\right)^{1+11}$

$= \left(\frac{-x}{y}\right)^{12}$

Verify the following by using the laws of exponent.

✓ $(3\times5)^4 = 3^4 \times 5^4$

Sol:- L·H·S

$= (3\times5)^4$

$\because x^m \cdot y^m = (xy)^m$

$= 3^4 \times 5^4$

R·H·S

$= 3^4 \times 5^4$

L·H·S = R·H·S

$= (3\times5)^4 = 3^4 \times 5^4$

✓ $(7\times9)^8 = 7^8 \times 9^8$

Sol: L·H·S

$= (7\times9)^8$

$\because x^m \cdot y^m = (xy)^m$

$= 7^8 \times 9^8$

R·H·S

$= 7^8 \times 9^8$

L·H·S = R·H·S

$(2)^6 \times (2)^3 = 2^9$

Sol: $(2)^6 \times (2)^3 = 2^9$

$\because x^m \cdot x^n = x^{m+n}$

$= L \cdot H \cdot S \rightarrow$

$= (2)^{6+3}$

$= (2)^9$

$R \cdot H \cdot S = 2^9$

$L \cdot H \cdot S = R \cdot H \cdot S$

✓ $(x * y)^m = x^m y^m$

Sol: $(x \times y)^m$

$L \cdot H \cdot S$

$\because x^m \cdot y^m = (xy)^m$

$= x^m y^m$

$R \cdot H \cdot S = x^3 y^3$

$L \cdot H \cdot S = R \cdot H \cdot S$

$(8)^5 \times (8)^7 = (8)^{12}$

Sol: $L \cdot H \cdot S \rightarrow$

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

$\because x^m \cdot x^n = x^{m+n}$

$R \cdot H \cdot S = (8)^{12}$

$= (8)^{5+7}$

$= (8)^{12}$

$(p)^r \times (p)^s = p^{r+s}$

L·H·S $= (p)^r \times (p)^s$

$= \because x^m \cdot x^n = x^{m+n}$

$= (p)^{r+s}$

$= p^{r+s}$

R·H·S

$= p^{r+s}$

$y^r \cdot y^r = (xy)^r$

So

$(x \times y)^m = x^m y^m$

L·H·S

$(x \times y)^m$

R·H·S

$= x^m y^m$

$= (x \times x \times x \cdots x$ (m times

$(y \times y \times \cdots y$ (m times

$= (x \times y) \times (x \times y \cdots$

$(x \times y)$ m times

$= (x \times y)^{(1+1+1 \cdots 1)m \text{ times}}$

$= (x \times y)^m$