

powers and Roots High Level Questions:

Q.1: $a^5 \times a^6 \div a^7$

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

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

Sol $a^5 \times a^6 \div a^7$

$a^{5+6} \div a^7$

$a^{11} \div a^7 \Rightarrow a^{11-7} \Rightarrow \boxed{a^4}$ Ans

Q.2: $\frac{a}{b^3} \times \frac{ab}{c} \times \frac{b^2c}{a^2}$

Sol $\frac{a \times ab \times b^2c}{b^3 \times c \times a^2} = \frac{a^{1+1} \times b^{1+2} \times c}{b^3 \times c \times a^2}$

$= \frac{a^2 b^3 c}{a^2 b^3 c} = a^{\frac{2}{2}} \times a^{\frac{-2}{-2}} \times b^{\frac{3}{3}} \times b^{\frac{-3}{-3}} \times c^{\frac{1}{1}} \times c^{\frac{-1}{-1}}$

$= a^{2-2} \times b^{3-3} \times c^{1-1}$

$= a^0 \times b^0 \times c^0$

$= 1 \times 1 \times 1$

$= 1$

$\therefore a^0 = 1$

Q.3: $\sqrt{100-4x^2}$

Sol $\sqrt{100-4x^2}$

$= \sqrt{10^2 - 4x^2}$

$= \sqrt{10^2 - 2^2 x^2}$

$= \sqrt{(10-2x)^2}$

$= ((10-2x)^2)^{\frac{1}{2}}$

$= ((10-2x)^2)^{\frac{1}{2}}$

$(10-2x)^1 = \boxed{10-2x}$

$\therefore 10^2 = 100$

$\therefore 2^2 = 4$

$\therefore \sqrt{} = \frac{1}{2}$

$\therefore 2 \times \frac{1}{2} = 1$

Q.4: $3^n = \frac{3^x}{9^y}$

Find $n = ?$

In terms of x and y .

Sol $3^n = \frac{3^x}{9^y}$

$\therefore 9 = 3^2$

$3^n = \frac{3^x}{(3^2)^y}$

$3^n = \frac{3^x}{3^{2y}} \Rightarrow 3^n = \frac{3^x}{3^{2y}}$

$3^n = (3)^{x-2y}$

$\boxed{n = x-2y}$

Q.5: $(x^2 y^8)^{\frac{3}{4}}$

Sol $(x^2 y^8)^{\frac{3}{4}} \Rightarrow (x^2)^{\frac{3}{4}} \times (y^8)^{\frac{3}{4}}$

$= x^{2 \times \frac{3}{4}} \times y^{8 \times \frac{3}{4}} = x^{\frac{3 \times 2}{4}} \times y^{\frac{2 \times 3}{1}}$

$= x^{\frac{3}{2}} \times y^6 \Rightarrow \boxed{x^{\frac{3}{2}} y^6}$ Ans

Q.6: $\left(\frac{256x^{20}}{y^8}\right)^{\frac{1}{4}}$

Sol $\left(\frac{256x^{20}}{y^8}\right)^{\frac{1}{4}} \Rightarrow \frac{(256)^{\frac{1}{4}} \times (x^{20})^{\frac{1}{4}}}{(y^8)^{\frac{1}{4}}}$

$4^4 = 256$

$= \frac{(4^4)^{\frac{1}{4}} \times (x^{20})^{\frac{1}{4}}}{(y^8)^{\frac{1}{4}}} \Rightarrow \frac{4^{4 \times \frac{1}{4}} \times x^{\frac{20 \times 1}{4}}}{y^{\frac{8 \times 1}{4}}}$

$= \frac{4^1 \times x^5}{y^2} \Rightarrow \boxed{\frac{4x^5}{y^2}}$ Ans.