

Chapter 12

Exponents and Powers

Example:

By which number should $\left(\frac{1}{9}\right)^{-2}$ be multiplied to get $\left(\frac{3}{8}\right)^{-4}$ as product?

Sol.

Let the required number be 'x'. Then

Factor \times Factor = Product

$$\Rightarrow x \times \left(\frac{1}{9}\right)^{-2} = \left(\frac{3}{8}\right)^{-4}$$

$$\Rightarrow x = \frac{\left(\frac{3}{8}\right)^{-4}}{\left(\frac{1}{9}\right)^{-2}} = \frac{\left(\frac{3}{8}\right)^{-4}}{9^2} \quad \left(\because \left(\frac{a}{b}\right)^{-m} = \left(\frac{b}{a}\right)^m \right)$$

$$= \frac{3^{-4}}{8^{-4}} \times \frac{1}{9^2}$$

$$= \frac{3^{-4} \times 1}{8^{-4} \times (3^2)^2}$$

$$= \frac{3^{-4} \times 1}{8^{-4} \times 3^4}$$

$$= \frac{3^{-4} \times 3^{-4}}{8^{-4}} \quad \left(\because a^{-n} = \frac{1}{a^n} \right)$$

$$= \frac{3^{-8}}{8^{-4}}$$

\therefore The required number $x = \frac{8^4}{3^8}$