

Prime Factors (LCM & HCF Word Problems)

- 1) Write 720 as a product of its prime factors.
Show your working clearly.

$$720 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5$$

$$720 = 2^4 \times 3^2 \times 5 \quad \text{Ans}$$

$$\begin{array}{r|l} 2 & 720 \\ \hline 2 & 360 \\ \hline 2 & 180 \\ \hline 2 & 90 \\ \hline 3 & 45 \\ \hline 3 & 15 \\ \hline 5 & 5 \\ \hline & 1 \end{array} \quad 3,$$

- 2) Find the smallest whole number that 720 can be multiplied by give a square number.

$$720 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5$$

$$720 = 2^4 \times 3^2 \times 5^1$$

$$\rightarrow 720 \times 5 = 2^4 \times 3^2 \times 5^1 \times 5^1$$

$$3600 = 2^4 \times 3^2 \times 5^2$$

$$3600 = 2^2 \times 2^2 \times 3^2 \times 5^2$$

$$3600 = (2 \times 2 \times 3 \times 5)^2$$

Taking sq. root $\sqrt{\quad}$ on b/s

$$\sqrt{3600} = \sqrt{(2 \times 2 \times 3 \times 5)^2}$$

$$\sqrt{3600} = 2 \times 2 \times 3 \times 5$$

$$60 = 60$$

$$\begin{array}{r|l} 2 & 720 \\ \hline 2 & 360 \\ \hline 2 & 180 \\ \hline 2 & 90 \\ \hline 3 & 45 \\ \hline 3 & 15 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$L.H.S = R.H.S$$

So, $\boxed{5} \rightarrow 720 \Rightarrow$ Square Number.

$$3) \quad A = 2^3 \times 5 \times 7^2 \times 11$$

$$B = 2^4 \times 7 \times 11$$

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

(a) Find the Lowest Common Multiple (LCM) of A, B, and C.

(b) Find the HCF of A, B, C.

$$\text{sol (a)} \quad A = 2^3 \times 5 \times 7^2 \times 11 \quad A \Rightarrow 2^3 \times 3^0 \times 5^1 \times 7^2 \times 11^1$$

$$B = 2^4 \times 7 \times 11 \quad B \Rightarrow 2^4 \times 3^0 \times 5^0 \times 7^1 \times 11^1$$

$$C = 3 \times 5^2 \quad C \Rightarrow 2^0 \times 3^1 \times 5^2 \times 7^0 \times 11^0$$

$$(a) \quad LCM(A, B, C) = 2^4 \times 3^1 \times 5^2 \times 7^2 \times 11^1$$

$$= 2^4 \times 3 \times 5^2 \times 7^2 \times 11$$

$$\therefore a^0 = 1$$

$$(b) \quad HCF(A, B, C) = 2^0 \times 3^0 \times 5^0 \times 7^0 \times 11^0$$

$$= 1 \times 1 \times 1 \times 1 \times 1$$

$$= 1$$

$$4) \quad A = 3^5 \times 5 \times 7^3$$

$$B = 2^3 \times 3 \times 7^4$$

(a) Find the LCM of A and B.

(b) Find the HCF of A and B

$$\text{sol (a)} \quad A = 3^5 \times 5 \times 7^3 \Rightarrow A \Rightarrow 2^0 \times 3^5 \times 5^1 \times 7^3$$

$$B = 2^3 \times 3 \times 7^4 \Rightarrow B \Rightarrow 2^3 \times 3^1 \times 5^0 \times 7^4$$

$$(a) \quad LCM(A, B) = 2^3 \times 3^5 \times 5^1 \times 7^4$$

$$(b) \quad HCF(A, B) = 2^0 \times 3^1 \times 5^0 \times 7^3$$

$$= 3 \times 7^3$$