

Chapter 1 - Real Numbers

Example 6 : Find the LCM and HCF of 6 and 20 by the prime factorisation method.

$$\begin{array}{r|l} 2 & 6 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\textcircled{2} \times 3$$

$$\begin{array}{r|l} 2 & 20 \\ \hline 2 & 10 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$\textcircled{2} \times 2 \times 5$$

$$\text{L.C.M} \rightarrow 2 \times 3 \times 2 \times 5 = 60$$

$$\text{H.C.F} \rightarrow 2$$

2. Find the LCM and HCF of the following pairs of integers and verify that $\text{LCM} \times \text{HCF} =$ product of the two numbers.

(i) 26 and 91

(ii) 510 and 92

(iii) 336 and 54

$$\begin{array}{r|l} 2 & 26 \\ \hline 13 & 13 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 7 & 91 \\ \hline 13 & 13 \\ \hline & 1 \end{array}$$

$$2 \times 13$$

$$7 \times 13$$

$$\text{L.C.M} \rightarrow 13 \times 2 \times 7 = 13 \times 14 = 182.$$

$$\text{H.C.F} \rightarrow 13$$

$$182 \times 13 = 26 \times 91$$

$$\begin{array}{r} 4 + 3 = 7 \\ \hline 13 \times 14 \\ \hline 1 \quad 8 \quad 2 \\ \hline 182 \end{array}$$

$$2366 = 2366$$

(ii) 510 and 92

$$\begin{array}{r|l} 2 & 510 \\ \hline 5 & 255 \\ \hline 3 & 51 \\ \hline 17 & 17 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 92 \\ \hline 2 & 46 \\ \hline 23 & 23 \\ \hline & 1 \end{array}$$

$$② \times 5 \times 3 \times 17$$

$$② \times 2 \times 23$$

$$\text{L.C.M} \rightarrow 2 \times 5 \times 3 \times 17 \times 2 \times 23$$

$$\rightarrow 10 \times 34 \times 69$$

$$\rightarrow 23460$$

$$\text{H.C.F} \rightarrow 2.$$

$$\begin{array}{r} 182 \times 13 \\ \hline 1 \quad 3 \quad 6 \quad 6 \\ \hline 2366 \end{array} \quad \begin{array}{l} 2+24 \\ = 26 \\ 8+3 \\ = 11 \end{array}$$

$$\begin{array}{r} 34 \times 69 \\ \hline 18^5 \quad 4^3 \quad 6 \end{array}$$

$$\underline{2346}$$

$$\begin{array}{l} 24+27 \\ = \end{array}$$

Example 8 : Find the HCF and LCM of 6, 72 and 120, using the prime factorisation method.

$$\begin{array}{r|l} 2 & 6 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 72 \\ \hline 2 & 36 \\ \hline 2 & 18 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 120 \\ \hline 2 & 60 \\ \hline 2 & 30 \\ \hline 5 & 15 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$2^1 \times 3^1$$

$$2^3 \times 2 \times 2 \times 3^2 \times 3$$

$$2^3 \times 2 \times 2 \times 5 \times 3^1$$

$$\text{L.C.M} \rightarrow 2^3 \times 3^2 \times 5 = 8 \times 9 \times 5 = 360$$

$$\text{H.C.F} \rightarrow 2 \times 3 = 6$$

3. Find the LCM and HCF of the following integers by applying the prime factorisation method.

(i) 12, 15 and 21

(ii) 17, 23 and 29

(iii) 8, 9 and 25

$$\begin{array}{r|l} 2 & 12 \\ \hline 2 & 6 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 5 & 15 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 7 & 21 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\underbrace{2^2 \times 2 \times 3^3}$$

$$5 \times 3^3$$

$$7 \times 3^3$$

$$\text{L.C.M} \rightarrow 2^2 \times 3 \times 5 \times 7 = 420$$

$$\text{H.C.F} \rightarrow 3.$$

$$17, 23, 29.$$

$$\text{H.C.F} = 1.$$

$$\text{L.C.M} = \underline{17 \times 23 \times 29}$$

$$(20 - 3)(20 + 3) \times 29$$

$$\{(20)^2 - (3)^2\} \times 29$$

$$\{400 - 9\} \times 29$$

$$= 11600 - 261 = 11339.$$