Ex: 8.2

Q1. Express each number as product of their prime factors:

(i) 140 (ii) 156 (iii) 3825 (iv) 5005

To find the prime factors we will be using the method of Prime factorisation.

(i) 140

$$\begin{array}{r|l} 2 & 140 \\ \hline 2 & 70 \\ \hline 5 & 35 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$\therefore 140 = 2 \times 2 \times 5 \times 7$

$140 = 2^2 \times 5 \times 7$

(ii) 156

$$\begin{array}{r|l} 2 & 156 \\ \hline 2 & 78 \\ \hline 3 & 39 \\ \hline 13 & 13 \\ \hline & 1 \end{array}$$

$\therefore 156 = 2 \times 2 \times 3 \times 13$

$156 = 2^2 \times 3 \times 13$

(iii) 3825

$$\begin{array}{r|l} 5 & 3825 \\ \hline 5 & 765 \\ \hline 3 & 153 \\ \hline 3 & 51 \\ \hline 17 & 17 \\ \hline & 1 \end{array}$$

$\therefore 3825 = 5 \times 5 \times 3 \times 3 \times 17$

$3825 = 5^2 \times 3^2 \times 17$

(iv) 5005

$$\begin{array}{r|l} 5 & 5005 \\ \hline 7 & 1001 \\ \hline 11 & 143 \\ \hline 13 & 13 \\ \hline & 1 \end{array}$$

$\therefore 5005 = 5 \times 7 \times 11 \times 13$

Ex: 8.2

Q1. Express each number as product of their prime factors:
(iv) 7429

To find the prime factors we will be using the method of prime factorisation.

(v) 7429

$$\begin{array}{r|l} 17 & 7429 \\ \hline 19 & 437 \\ \hline 23 & 23 \\ \hline & 1 \end{array}$$

$\therefore$ $7429 = \underline{\underline{17 \times 19 \times 23}}$

Ex: 8.2

Q2. Find the LCM and HCF of the following numbers and verify that LCM x HCF = product of the two numbers

(i) 26 and 91

$\begin{array}{c|c} 9 & 1 \end{array}$

$1 \times 2 = 2$

$9 - 2 = 7$

Sol:- LCM ⇒

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

$LCM = 13 \times 14 = 182 = LCM(26, 91)$

$a = bq + r \; ; 0 \le r < b$

$91 = (26)(3) + 13$

$26 = (13)(2) + 0$

$HCF(26, 91) = 13$

$$\begin{array}{r} 3 \\ 26 \overline{) 91 } \\ 78 \\ \hline 13 \end{array}$$

Verification:

LCM (26, 91) x HCF (26, 91) = 182 x 13 = 2366

Product of 26 x 91 = 2366

Hence, LCM (a, b) x HCF (a, b) = a x b. Verified...

Ex: 8.2

Q2. Find the LCM and HCF of the following numbers and verify that LCM x HCF = product of the two numbers

(ii) 510 and 92

let, a = 510

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

$\therefore 510 = 2 \times 3 \times 5 \times 17$

b = 92

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

$\therefore 92 = 2^2 \times 23$

$510 = 2 \times 3 \times 5 \times 17$

$92 = 2^2 \times 23$

$\therefore$ HCF = 2

LCM = $2^2 \times 3 \times 5 \times 17 \times 23 = 23460$

Verification:

LCM (510, 92) x HCF (510, 92) = 23460 x 2 = 46920

Product of 510 x 92 = 46920

Hence, LCM (a, b) x HCF (a, b) = a x b. Verified...

Ex: 8.2

Q2. Find the LCM and HCF of the following numbers and verify that LCM x HCF = product of the two numbers

(iii) 336 and 54

$a = 336$ $\qquad$ $b = 54$

$$\begin{array}{r|l} 2 & 336 \\ \hline 2 & 168 \\ \hline 2 & 84 \\ \hline 2 & 42 \\ \hline 3 & 21 \\ \hline 7 & 7 \\ \hline & 1 \end{array} \qquad \begin{array}{r|l} 2 & 54 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$336 = 2 \times 2 \times 2 \times 2 \times 3 \times 7 = 2^4 \times 3 \times 7$

$54 = 2 \times 3 \times 3 \times 3 \qquad = 2 \times 3^3$

$\therefore$ HCF $= 2 \times 3 = 6$

LCM $= 2^4 \times 3^3 \times 7 = 3024$

Verification:

LCM (336, 54) x HCF (336, 54) = 3024 x 6 = 18144

Product of 336 x 54 = 18144

Hence, LCM (a, b) x HCF (a, b) = a x b. Verified...

Ex: 8.2

Q3. Find the LCM and HCF of the following integers by applying the prime factorization method.

(i) 12, 15 and 21 (ii) 17, 23 and 29 (iii) 8, 9 and 25

Prime factors of:

$12 = 2 \times 2 \times 3$

$15 = 3 \times 5$

$21 = 3 \times 7$

$\therefore HCF = 3$

$LCM = 3 \times 2 \times 2 \times 5 \times 7 = 420$

Prime factors of

$17 = 17 \times 1$

$23 = 23 \times 1$

$29 = 29 \times 1$

$\therefore HCF = 1$

$LCM = 17 \times 23 \times 29 = 11339$

Prime factors of:

$8 = 2 \times 2 \times 2$

$9 = 3 \times 3$

$25 = 5 \times 5$

$\therefore HCF = 1$

$LCM = 2^3 \times 3^2 \times 5^2 = 1800$

Ex: 8.2

Q4. Given that HCF (306, 657) = 9, find LCM (306, 657).

We know that, LCM (a, b) x HCF (a, b) = a x b.

So, LCM (306, 657) x HCF (306, 657) = 306 x 657.

LCM (306, 657) x 9 = 306 x 657.

LCM (306, 657) = $\frac{306 \times 657}{9}$

LCM (306, 657) = 22338

Ex: 8.2

Q5. Check whether 6^n can end with the digit 0 for any natural number n.

If the number ends with 0, then the prime factorization of the number must contain the factors of 10. i.e., 2, 5 $(10 = 2 \times 5)$

But, $6 = 2 \times 3$

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

$$6^n = 2^n \times 3^n$$

Here, 6^n does not contain both the factors of 10, thus cannot end with digit 0 for any natural number n.

Ex: 8.2

Q6. Explain why $7 \times 11 \times 13 + 13$ and $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5$ are composite numbers.

$\times 7 = 7 \times 1$

$6 = 2 \times 3$

$42 \times 24 = 168 + 840 = 1008$

$(7 \times 11 \times 13) + (13)$

$13[7 \times 11 + 1]$

common

$13[77 + 1]$

$\boxed{13 \times 78} = 1014$

composite ✓

$5[(7 \times 6 \times 1 \times 4 \times 3 \times 2 \times 1) + 1]$

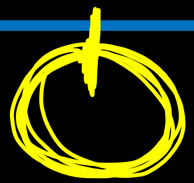
common

$5[1008 + 1]$

$5[1009] = 5045$

Composite ✓

R = 3 ✓ S = 2 ✓



Ex: 8.2

Q7. There is a circular path around a sports field. Sonia takes 18 minutes to drive one round of the field, while Ravi takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?

36 min.

Sonia takes 18 minutes to drive one round of the field.

Ravi takes 12 minutes for the same.

The time of their meeting is the LCM of 18 and 12 in minutes.

	R	S
1.	12	18
2	24	36
3	36	54

2	12, 18
2	6, 9
3	3, 9
3	1, 3
	1, 1

$LCM = 2^2 \times 3^2 = 36$ min.

∴ They will meet at the starting point after 36 minutes.