

# LCM & HCF

## LCM - Least Common Multiple

- Methods :
- (1) Traditional Method.
  - (2) Factorisation.
  - (3) Long Division.
  - (4) Short cut Method.

### Traditional Method:

(1) Find LCM for 8, 12, 6, 4 ?

8	12	6	4
16	24	12	8
24	36	18	12
32	48	24	16
40	60	30	20
48	72	36	24

Least Common Number  
Select ^ factor

Ans: 24

### Factorisation Method:

(1) Find LCM 8, 12, 6, 4 ?

$$\begin{array}{l}
 2 \overline{) 8} \quad 2 \overline{) 12} \quad 2 \overline{) 6} \quad 2 \overline{) 4} \\
 \underline{2 \ 4} \quad \underline{2 \ 6} \quad \underline{3 \ 3} \quad \underline{2 \ 2} \\
 \underline{2 \ 2} \quad \underline{3 \ 3} \quad \underline{1} \quad \underline{1} \\
 \Rightarrow 2^3 \quad \Rightarrow 2^2 3^1 \quad \Rightarrow 2 \times 3 \quad \Rightarrow 2^2
 \end{array}$$

$$\begin{aligned}
 &\Rightarrow 2^3 \times 3^1 \\
 &\Rightarrow 8 \times 3 = \underline{24}
 \end{aligned}$$

(2) Find LCM of 12, 8, 15?

$$\begin{array}{r} 2 \overline{) 12} \\ \underline{2} \phantom{0} \\ 2 \phantom{0} \\ \underline{6} \phantom{0} \\ 3 \phantom{0} \\ \underline{3} \phantom{0} \\ 1 \phantom{0} \\ \underline{1} \phantom{0} \\ 0 \phantom{0} \end{array}$$

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

$$\begin{array}{r} 2 \overline{) 8} \\ \underline{2} \phantom{0} \\ 2 \phantom{0} \\ \underline{4} \phantom{0} \\ 2 \phantom{0} \\ \underline{2} \phantom{0} \\ 1 \phantom{0} \\ \underline{1} \phantom{0} \\ 0 \phantom{0} \end{array}$$

$$\Rightarrow 2^3$$

$$\begin{array}{r} 3 \overline{) 15} \\ \underline{3} \phantom{0} \\ 5 \phantom{0} \\ \underline{5} \phantom{0} \\ 1 \phantom{0} \\ \underline{1} \phantom{0} \\ 0 \phantom{0} \end{array}$$

$$\Rightarrow 3 \times 5$$

$$\Rightarrow 2^3 \times 3 \times 5$$

$$\Rightarrow 8 \times 3 \times 5 = \underline{120}$$

### Long-Division Method

(1) Find LCM 8, 12, 6, 4?

$$\begin{array}{r} 2 \overline{) 8, 12, 6, 4} \\ \underline{4, 6, 3, 2} \\ 2 \overline{) 4, 6, 3, 2} \\ \underline{2, 3, 3, 1} \\ 2 \overline{) 2, 3, 3, 1} \\ \underline{1, 3, 3, 1} \\ 3 \overline{) 1, 3, 3, 1} \\ \underline{1, 1, 1, 1} \\ \underline{1, 1, 1, 1} \\ 0 \phantom{0} \end{array}$$

$$\Rightarrow \underline{24}$$

(2) Find LCM 12, 8, 15?

$$\begin{array}{r} 2 \overline{) 12, 8, 15} \\ \underline{6, 4, 15} \\ 2 \overline{) 6, 4, 15} \\ \underline{3, 2, 15} \\ 2 \overline{) 3, 2, 15} \\ \underline{3, 1, 15} \\ 3 \overline{) 3, 1, 15} \\ \underline{1, 1, 5} \\ 5 \overline{) 1, 1, 5} \\ \underline{1, 1, 1} \\ 0 \phantom{0} \end{array}$$

$$\Rightarrow 2 \times 2 \times 2 \times 3 \times 5$$

$$\Rightarrow \underline{120}$$

# Short cut Method:

select highest number and check divisibility

① <sup>LCM</sup> 8, 12, 6, 4 ? = 24.

② 12, 6, 24, 8 ? = 24.

③ 12, 3, 9 ? = 36.

④ 3, 11, 12 ? = 11 x 12  
⇒ 132.

If, prime number is there, take and multiply.

\_\_\_\_\_ x \_\_\_\_\_

## HCF

Highest Common Factors

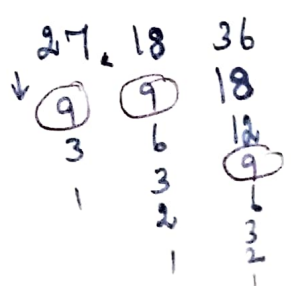
Methods:

- (1) Traditional Method.
- (2) Factorisation Method.
- (3) Division Method.
- (4) Short cut Method.

### Traditional Method:

(1) Find HCF of

Ans: 9



Big Number Find factors  
to  
Small Number  
⇒ Common highest

(2) HCF of 8, 12, 6, 4

8	12	6	4
↓			
4	6	3	(2)
(2)	4	(2)	1
1	3	1	
	(2)		
	1		

→ Common highest  
⇒ 2

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Factorisation Method:

(1) Find HCF of 27, 18, 36

3		27
3		9
3		3
		1
3 <sup>3</sup>		

2		18
3		9
3		3
		1
2 <sup>1</sup> × 3 <sup>2</sup>		

2		36
2		18
3		9
3		3
		1
2 <sup>2</sup> × 3 <sup>2</sup>		

⇒ Select Common Number and Lowest power.

⇒ 3<sup>2</sup> = 9

(2) HCF 12, 6, 8, 4

2		12
2		6
3		3
		1
⇒ 2 <sup>2</sup> × 3 <sup>1</sup>		

2		6
3		3
		1
⇒ 2 <sup>1</sup> × 3 <sup>1</sup>		

2		8
2		4
2		2
		1
⇒ 2 <sup>3</sup>		

2		4
2		2
		1
⇒ 2 <sup>2</sup>		

⇒ 2<sup>1</sup> = 2

# Division Method:

(1) Find HCF for 70 and 90 ?

$$\begin{array}{r} \text{Divisor} \\ 70 \overline{) 90} \\ \underline{70} \phantom{0} \\ 20 \end{array}$$
  

$$\begin{array}{r} 20 \overline{) 70} \rightarrow \text{Remides} \\ \underline{40} \\ 30 \\ \underline{20} \\ 10 \end{array}$$
  

$$\begin{array}{r} 10 \overline{) 20} \\ \underline{20} \\ 0 \end{array}$$

Take Highest number and divide by another number.

⇒ H.C.F = 10.

(2) Find HCF for 360 and 132 ?

$$\begin{array}{r} 2 \\ 132 \overline{) 360} \\ \underline{264} \\ 96 \end{array}$$
  

$$\begin{array}{r} 1 \\ 132 \overline{) 96} \\ \underline{96} \\ 0 \end{array}$$
  

$$\begin{array}{r} 2 \\ 96 \overline{) 36} \\ \underline{72} \\ 36 \end{array}$$
  

$$\begin{array}{r} 2 \\ 18 \overline{) 36} \\ \underline{36} \\ 0 \end{array}$$

H.C.F = 18.

(3) Find HCF for 27, 18 and 36 ?

$$\begin{array}{r} 1 \\ 18 \overline{) 27} \\ \underline{18} \\ 9 \end{array}$$
  

$$\begin{array}{r} 2 \\ 9 \overline{) 18} \\ \underline{18} \\ 0 \end{array}$$
  

$$\begin{array}{r} 4 \\ 9 \overline{) 36} \\ \underline{36} \\ 0 \end{array}$$

H.C.F = 9

for 27 & 18 ⇒ 9

## Short cut Method:

→ Use, when <sup>Numbers are</sup> Below 100.

(1) H.C.F of 27, 18, 36 ?

$$27, \boxed{18}, 36 \Rightarrow \underline{9}$$

select small number  
↓  
find Factors

H.C.F  
(2) 24, 42, 30 ?

$$\boxed{24}, 42, 30 \Rightarrow \underline{6}$$

~~12~~  
8  
6

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## LCM & HCF

Fractions

Short cut Method

(1) Find LCM of  $\frac{2}{5}, \frac{3}{15}, \frac{6}{25}$  ?

$$\boxed{\text{LCM} = \frac{\text{LCM of Numerator}}{\text{HCF of Denominator}}}$$

→ Ans LCM =  $\frac{6}{5}$

LCM (N) = 2, 3, 6  $\Rightarrow$  6.  $\Rightarrow$

HCF (D) = 5, 15, 25  $\Rightarrow$  5.

$$\text{LCM} = \frac{27}{50}, \frac{9}{20}, \frac{6}{25}$$

$$\text{LCM} = \frac{\text{LCM}(N)}{\text{HCF}(D)}$$

$$\text{LCM}(N) = \textcircled{27}, 9, 6 \Rightarrow 54.$$

$$\Rightarrow \text{Ans} = \frac{54}{5}$$

$$\text{HCF}(D) = 50, \textcircled{20}, 25 \Rightarrow 5.$$

$$\begin{array}{c} \text{Factors } 10 \times \\ \textcircled{5} \\ 4 \\ 2 \end{array}$$

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$$(3) \text{ Find LCM of } \frac{2}{3}, \frac{4}{9}, \frac{5}{6}, \frac{7}{12} ?$$

$$\text{LCM} = \frac{\text{LCM}(N)}{\text{HCF}(D)}$$

$$\text{LCM}(N) = 2, 4, 5, 7 \Rightarrow 7 \times 5 \times 4 = \underline{\underline{140}}$$

$$\text{HCF}(D) = \textcircled{3}, 9, 6, 12 \Rightarrow \underline{\underline{3}}$$

$$\boxed{\text{LCM} = \frac{140}{3}}$$

$$\boxed{\text{H.C.F} = \frac{\text{H.C.F}(N)}{\text{L.C.M } D}}$$

Find H.C.F  $\Rightarrow \frac{4}{9}, \frac{6}{2}, \text{ and } \frac{20}{63}$

$$\text{H.C.F} = \frac{\text{H.C.F}(N)}{\text{L.C.M}(D)}$$

$$\text{H.C.F}(N) = \frac{4}{2}, 10, 20 \Rightarrow \underline{\underline{2}}$$

Ans:  $\Rightarrow \frac{2}{63}$

$$\text{L.C.M}(D) = 9, 21, \frac{63}{1} \Rightarrow \underline{\underline{63}}$$

### Decimal

LCM  $\rightarrow$  Long division Method  
HCF  $\rightarrow$  Division Method

Find LCM  $\Rightarrow \frac{9}{10}, \frac{6}{10}, \frac{7}{10}$   
1.2, 1.5, 2 and 5?

$$\Rightarrow \boxed{1.2, 1.5, 2, 5}$$

$\downarrow$

$$\Rightarrow 1.2, 1.5, 2.0, 5.0$$

$$(X10) \rightarrow 12, 15, 20, 50$$

$$\text{LCM} = 2 \times 2 \times 3 \times 5 \times 5$$

$$\Rightarrow 300.$$

$$\Rightarrow \text{LCM} = \frac{300}{10} = \boxed{30}$$

$$\begin{array}{r} 2 \overline{) 12, 15, 20, 50} \\ \underline{6, 15, 10, 25} \\ 2 \overline{) 3, 5, 5, 25} \\ \underline{3, 5, 5, 25} \\ 3 \overline{) 1, 5, 5, 25} \\ \underline{1, 5, 5, 25} \\ 5 \overline{) 1, 1, 1, 5} \\ \underline{1, 1, 1, 1} \\ 5 \overline{) 1, 1, 1, 1} \\ \underline{1, 1, 1, 1} \end{array}$$

Step: 1  $\Rightarrow$  Equal  
Decimal

2: Multiply by  
LCM to remove  
Decimal

$$\begin{array}{r} 12 \\ 25 \overline{) 1} \\ \underline{60} \\ 14 \\ \underline{200} \end{array}$$

$\div 10$



② Find Lcm for 1.20, 0.24 and 6?

→ 1.20, 0.24, 6.00

(x 100) → 120, 24, 600

2	120, 24, 600
2	60, 12, 300
2	30, 6, 150
3	15, 3, <del>75</del>
5	5, 1, 25
5	1, 1, 5
	1, 1, 1

⇒  $2 \times 2 \times 2 \times 3 \times 5 \times 5$   
 ⇒  $24 \times 25$   
 ⇒ ~~75~~ 600

LCM ⇒  $\frac{600}{100} = \boxed{6}$

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Ex:3 Find Lcm for 0.12, 0.96 and 0.6?

→ 0.12, 0.96, 0.60

(x 100) → 12, 96, 60

2	12, 96, 60
2	6, 48, 30
2	3, 24, 15
2	3, 12, 15
3	3, 6, 15
2	1, 2, 5
5	1, 1, 5
	1, 1, 1

⇒  $2 \times 2 \times 2 \times 2 \times 3 \times 2 \times 5$   
 ⇒  $32 \times 15$   
 ⇒ 480  
 ⇒  $\frac{480}{100} = \underline{\underline{4.8}}$

$\frac{32}{15}$   
 $\frac{160}{32}$   
 $\frac{480}{480}$

H.C.F Decimal

Ex: Find HCF for 6.16 and 13 ?

⇒ 6.16, 13.00

(x100) ⇒ 616, 1300

	2		
616	1300		
	1232	9	
		68	
		616	
		612	4
			17
			68
			68
			0

LCM ⇒  $\frac{4}{100} = 0.04$

Product of Numbers

Ex: 12, 9 ⇒ 12 × 9 = 108

LCM ⇒ 36  
HCF = 3  
} x = 108

check it method.

Product of Two Numbers = LCM × HCF

$N_1 \times N_2 = LCM \times HCF$

Q2 LCM and HCF of two no are 1260 and 63 respectively. If one of the number is 315. find other.

$LCM \times HCF = N_1 \times N_2$   
 $1260 \times 63 = 315 \times N_2$

$N_2 = \frac{1260 \times 63}{315} = 252$