

LCM & GCF System

↗ Greatest Common factor

↘ least common multiple

3, 5, 10

3, 6, 9, 15, 18, 21, 24, 27, 30

5, 10, 15, 20, 30, 35

10, 20, 30

30 is least common multiple.

$$\begin{array}{r|l} 5 & 3, 5, 10 \\ \hline & 3, 1, 2 \end{array}$$

$$\text{Lcm} \cdot 5 \times 3 \times 2 = 30$$

* LCM of numbers is divided by each of the no.

whereas GCF or GCM divides each of the no.

G, C F

find GCF of 15, 20, 25

$$15 = 3 \times 5 \quad \text{GCF} = 5$$

$$20 = 4 \times 5$$

$$25 = 5 \times 5$$

Product of two no = $\boxed{\text{LCM} \times \text{GCM}}$

1. What will be LCM of 16, 20, and 24?

$$\begin{array}{r|l} 4 & 16, 20, 24 \\ \hline 2 & 4, 5, 6 \\ \hline & 2, 5, 3 \end{array}$$

$$\text{LCM } 4 \times 2 \times 2 \times 5 \times 3 = 240$$

Note:-

$$\frac{24}{100} \times \frac{16}{10} \times \frac{32}{1000}$$

$$\frac{6}{25} \times \frac{8}{5} \times \frac{8}{250} = \frac{24}{5} = 4.8$$

~~$0.24 \times 0.16 \times 0.032$~~
 $30 = 30$

2. Find the Lcm of 0.24, 1.6, 0.032

Find Lcm 24, 16, 32

Lcm = 96
= 9.6
4.8

$$\begin{array}{r|l} 4 & 24, 16, 32 \\ \hline & 6, 4, 8 \\ 2 & 3, 2, 4 \\ \hline & 3, 1, 2 \\ 2 & 3, 1, 2 \end{array}$$

Lcm = 96

Find Lcm of 0.03 least decimal place = 2
 0.024 0.084

Lcm 3, 24, 84 = 168

1.68

3. Find HCF of 45, 48, and 96?

$$\text{HCF} = 3$$

$$45 = 3 \times 3 \times 5$$

$$48 = 2 \times 2 \times 2 \times 2 \times 3$$

$$96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$$

$$\text{HCF} = 3$$

45	48	1
	45	
3	45	15
	45	
		xx

HCF of 48 and 45 is 3.

Now find HCF of 3 and 96

3	96	32
	96	
		xx

HCF of 45, 48, 96

Highest
decimal place.
↑

4. Find the HCF of 0.16, 20, and 0.032?

16, 20, 32

HCF = .004

HCF

LCM of fraction = $\frac{\text{LCM of Numerator}}{\text{HCF denom.}}$

5. Find LCM of $\frac{4}{9}$, $\frac{7}{10}$, and $\frac{8}{15}$?

LCM of 4, 7, 8 is 56

HCF of 9, 10, 15 is 1

\therefore LCM of $\frac{4}{9}, \frac{7}{10}, \frac{8}{15}$ is 56.

find LCM $\frac{3}{8}, \frac{5}{2}, \frac{15}{6}$

LCM of Nr = 15

HCF of Dr = 2

LCM of fractions $\frac{3}{8}, \frac{5}{2}, \frac{15}{6}$ is $\frac{15}{2}$

6. Find HCF of $\frac{4}{7}, \frac{8}{9},$ and $\frac{10}{63}$?

Nr - Numerator
Dr - Denominator

HCF of fraction = $\frac{\text{HCF of Nr.}}{\text{LCM of Dr}}$

HCF of 4, 8, 10 is 2

LCM of 7, 9, 63 is 63.

HCF of $\frac{4}{7}, \frac{8}{9}, \frac{10}{63}$ is $\frac{2}{63}$

7. What is the least multiple of 13,
 which when ^{divided by} 6, 8 and 12 leaves 5, 7 and
 11 as remainder?

Trick: Find LCM - Difference

Here LCM of 6, 8, 12 is 24

$$\text{No. } 24 - 1 = 23$$

No. must be multiple of 13
 M

$$\text{No.} = \frac{24 \times n - 1}{13}$$

Natural no.

143

6, 8, 10
 11, 13, 15
 $165 \times 13 - 5$
 135

$$\begin{aligned} \text{No.} &= \text{LCM of } 13, 11, 15 - 5 \\ &= 13 \times 11 \times 15 - 5 \\ &= 13 \times 165 - 5 \\ &= \underline{2140} \text{ Ans} \end{aligned}$$

HW 8. A milkman has 3 Jar containing 57 liters, 129 liters and 177 liters of pure milk respectively. A measuring can leaves the same amount of milk Unmeasured in each Jar after a different number of exact measurements of milk in each jar. What is the volume of largest such can?

$$\begin{aligned} 177 - 57 &= 120 \\ 177 - 129 &= 48 \\ 129 - 57 &= 72 \end{aligned}$$

HCF =
24
litre

- (a.) 24 Liters (b) 22 liters
(c) 20 liters (d) 16 liters

9. In a party of children each one gives gift to others the total no. gifts distributed in that party was 132. Find the no. of children attend that party.

Let n children attend the party

$$n^2 - n = 132$$

$$n^2 - n - 132 = 0$$

$$n^2 - 12n + 11n - 132 = 0$$

$$n(n-12) + 11(n-12) = 0$$

$$n(n-1) = 132$$

$$n(n-1) = 12 \times 11$$

$$n-1 = 11 \Rightarrow n = 12$$

Compare $n = 12$ Ans

$$(n-12)(n+11) = 0$$

$n = 12$, $n = -11$

10. Find LCM of 4^{-2} , 4^{-4} , 4^{-6} .

↓ base are same and power
are negative then the least integer
power will be LCM

$$\text{LCM} = 4^{-2}$$

11. Find LCM of 5^{12} , 5^4 , 5^6 .

↓
LCM

→ greatest positive power
will be LCM.
when base
are same.

12. Find HCF of $6^8, 6^4, 6^3$.

↓ least positive power will be HCF

13. Find HCF of 3^{-2} , 3^{-4} , 3^{-6} .

↓
HCF

14. If LCM of two no. is 2310 and their HCF is 30. If one no. is 330. Then find the other no.

$$\text{LCM} \times \text{HCF} = \text{Product of two no}$$

$$2310 \times 30 = \overset{11}{\cancel{330}} \times x$$

$$\frac{2310}{11} = x$$

$$210 = x$$

15. If LCM of two no. is 24 times of their HCF. If The sum of HCF and LCM is 375 and one no. is 45, Then what will be the other no.?

$$\text{Let HCF} = x = 15$$

$$\text{LCM} = 24x = 360$$

$$\text{HCF} + \text{LCM} = 375$$

$$x + 24x = 375$$

$$25x = 375$$

$$x = 15$$

$$\text{Product of two no.} = \text{LCM} \times \text{HCF}$$

$$45 \times x = 360 \times 15$$

$$x = 120 =$$

16. (I). The greatest no. which when divided by 25, 73, and 97 leaves remainder equal in each Case.

$$73 - 25 = 48$$

$$97 - 73 = 24$$

$$97 - 25 = 72$$

$$\left(\frac{25}{24} = 1 \right)$$

$$\frac{73}{24} = 1$$

$$\frac{97}{24} = 1$$

Now, find HCF of 48, 24, 72
 = 24 Ans.

(II) The greatest no. which when divided by 1541, 2443, and 2607 leaves remainder equal in each Case.

$$2443 - 1541 = 902$$

$$2607 - 1541 = 1066$$

$$2607 - 2443 = 164$$

HCF of 82 and 164
 is 82

∴ Greatest no. is 82

$$\begin{array}{r} \text{HCF} \\ 902 \overline{) 1066} \\ \underline{902} \\ 164 \\ \underline{164} \\ 0 \end{array} \quad \begin{array}{r} 1 \\ 902 \overline{) 1066} \\ \underline{902} \\ 164 \\ \underline{164} \\ 0 \end{array} \quad \begin{array}{r} 5 \\ 82 \overline{) 902} \\ \underline{820} \\ 82 \\ \underline{82} \\ 0 \end{array} \quad \begin{array}{r} 2 \\ 82 \overline{) 164} \\ \underline{164} \\ 0 \end{array}$$

17. Find the least no. which is to be subtracted out of 1936 so that when it divided by 9, 10 and 15 leaves remainder 7 in each case. 93

find the Lcm of 9, 10, 15 = 90

$$\begin{array}{r}
 90 \overline{) 1936} \quad 21 \\
 \underline{180} \\
 136 \\
 \underline{90} \\
 46
 \end{array}$$

Remainder

$$\begin{aligned}
 \text{Required} &= 46 - 7 \\
 &= 39
 \end{aligned}$$

$$\begin{array}{r}
 1936 \\
 \underline{39} \\
 1897
 \end{array}$$

18. Find the least no. which is a perfect square which can be divided by 12, 15, 18 and 24 exactly.

Trick: Find the Lcm of no. and multiply the factors which is not paired up

$$\begin{aligned} \text{Lcm } & \underline{12}, \underline{15}, \underline{18}, \underline{24} \\ & = \underline{360} \times 10 = 3600 \\ & = \underline{2^3} \times \underline{3^2} \times 5^1 \times \underline{2} \times \underline{5} \end{aligned}$$

19. The least no. of five digits which can be divided by 40, 50, and 60 without remainder.

$$\begin{aligned} \text{LCM} &= 40, 50, 60 \\ &= 600 \end{aligned}$$

Trick: -
Take the LCM
of no. divide
least digit of five or four
digit no.

$$\begin{array}{r} 10000 \\ \underline{600} \\ 4000 \\ \underline{3600} \\ 400 \\ \underline{+200} \end{array}$$

$$\text{Ans } 10000 + 200 = 10200 \quad \underline{\text{Ans}}$$

HCF always divide the number
LCM is divided by numbers:

20. If HCF of three numbers is 30 and numbers are in ratio 2:3:5. Then numbers are

~~(a) 60:30:150~~

~~(b) 120:200:300~~

~~(c) 60:90:100~~

✓ (d) 60:90:150
2 : 3 : 5 ✓