

HCF & LCM

Factors and Multiples:

- If a number P divides another number Q exactly, we say that P is a factor of Q i.e. Q is a multiple of P .

H.C.F :

- The H.C.F of two or more than two numbers is the greatest number that divides each of them exactly.

L.C.M:

- The least number which is exactly divisible by each one of the given numbers is called their L.C.M

Product of two numbers:

- Product of their H.C.F and L.C.M

Co-primes :

- Two numbers are co-primes if their H.C.F is 1.

H.C.F and L.C.M of fractions :

- $$\text{H.C.F} = \frac{\text{H.C.F of Numerators}}{\text{L.C.M of Denominators}}$$
- $$\text{L.C.M} = \frac{\text{L.C.M of Numerators}}{\text{H.C.F of Denominators}}$$

PROBLEMS

• Find the H.C.F of 108, 360 and 600.

A - 12

B - 13

C - 14

D - 15

- Answer : A

Solution :

$$108 = 2^2 * 3^3$$

$$360 = 2^3 * 3^2 * 5$$

$$600 = 2^3 * 5^2 * 3$$

$$\therefore \text{H.C.F} = 2^2 * 3 = 4 * 3 = 12$$

• Compute H.C.F of $(2^2 * 2^3 * 5 * 7^4)$, $(2^3 * 3^2 * 5^2 * 7^3)$ and $(2^2 * 5^3 * 7^5)$.

A - 6760

B - 6860

C - 6960

D - 7060

- Answer : B

Solution:

Prime numbers which are common to all the given numbers are 2, 5, 7.

$$\therefore \text{H.C.F} = (2^2 * 5 * 7^3) = (4 * 5 * 343) = 6860$$

• Find the H.C.F of 148 and 185.

A - 37

B - 38

C - 39

D - 40

- Answer : A

Solution:

Remainder of $185/148 = 37$

Remainder of $148/37 = 0$

\therefore H.C.F. = 37

• **Find the H.C.F of 204, 1190 and 1445.**

A - 16

B - 17

C - 18

D - 19

- Answer: B

Solution:

Remainder of $1190/204 = 170$

Remainder of $204/170 = 34$

Remainder of $170/34 = 0$

∴ H.C.F. of 204, 1190 = 34

Remainder of $1145/34 = 17$

Remainder of $34/17 = 0$

∴ H.C.F. of 204, 1190 and 1145 = 17

• Find the L.C.M of $(2^2 * 3^2 * 5 * 7)$, $(2^3 * 3 * 5^2 * 7^2)$ and $(2 * 3 * 7 * 11)$.

A - 970200

B - 97020

C - 9702

D - 970

- Answer: A

Solution:

We have L.C.M

= product of terms containing highest powers of
(2,3,5,7,11)

$$= (2^3 * 3^2 * 5^2 * 7^2 * 11)$$

$$= (8 * 9 * 25 * 11 * 49)$$

$$= 970200$$

• **Find the L.C.M of 15, 18, 24, 27, 56.**

A - 7260

B - 7360

C - 7460

D - 7560

- Answer: D

Solution:

$$15 = 3 * 5$$

$$18 = 2 * 3 * 3 = 2 * 3^2$$

$$24 = 2 * 2 * 2 * 3 = 2^3 * 3$$

$$27 = 3 * 3 * 3 = 3^3$$

$$56 = 2 * 2 * 2 * 7 = 2^3 * 7$$

L.C.M = product of terms containing highest powers of (2,3,5,7)

$$= 2^3 * 3^3 * 5 * 7 = 7560$$

• **Reduce $391/667$ to lowest terms.**

A - $7/29$

B - $27/29$

C - $17/29$

D - $37/29$

- Answer : C

Solution:

First we find the H.C.F of 391 and 667.

Remainder of $667/391 = 276$

Remainder of $391/276 = 115$

Remainder of $276/115 = 46$

Remainder of $115/46 = 23$

Remainder of $46/23 = 0$

∴ H.C.F. of 391, 667 = 23

∴ $391/667 = (391/23)/(667/23) = 17/29$

- **Given the H.C. F of two numbers as 7 and their L.C.M as 210. If one of the numbers is 35, find the other.**

A - 32

B - 42

C - 52

D - 62

- Answer : B

Solution:

Let the Other number be X. then,

Product of numbers = product of their H.C .F and L.C.M

$$35 * x = 7 * 210 \Rightarrow x = 7 * 210 / 35 = 42$$

Hence, the other number is 42.

• **Three big drums contain 36 liters, 45 liters and 72 liters of oil. What is the biggest measure which can measure all the different quantities exactly?**

A - 9 liters

B - 10 liters

C - 11 liters

D - 12 liters

- Answer : A

Solution:

Required measure = H.C.F of 36 L, 45 L, and 72 L
= (3^2) liters = 9 liters

[As $36 = 2^2 * 3^2$, $45 = 3^2 * 5$ and $72 = 2^4 * 3^2$]

- **Four electronic devices make a beep after duration of 30 minutes, 1 hour, $3/2$ hours and 1 hour 45 min. respectively. If all the devices beeped together at 12 noon at what time will they beep together again?**

A - 9 am

B - 10 am

C - 11 am

D - 11:30 am

- Answer : A

Solution:

Intervals of beeping 30 min, 60 min, 90 min, 105 min.

Interval of beeping together= L.C.M of 30 min. 60 min. 90 min. 105 min

$$= (3*5*2*2*3*7) \text{ min.}$$

$$= 1260 \text{ min}$$

$$= 21 \text{ hrs.}$$

So, they will beep together again next morning at 9 am.

- **Find the smallest number which is exactly divisible by each one of the numbers 12, 15, 20 and 27.**

A - 540

B - 530

C - 520

D - 510

- Answer: A

Solution:

$$\begin{aligned}\text{Required no.} &= \text{L.C.M of } 12, 15, 20 \text{ and } 27 \\ &= 3*2*2*5*9 \\ &= 540\end{aligned}$$

- **Find the least number which if divided by 6, 7, 8, 9, 12 leaves the same remainder 2 in each case.**

A - 506

B - 504

C - 502

D - 500

- Answer : A

Solution:

$$\begin{aligned}\text{Required number} &= (\text{L.C.M of } 6, 7, 8, 9, 12) + 2 \\ &= (2 * 3 * 2 * 7 * 2 * 3) + 2 \\ &= (504 + 2) \\ &= 506.\end{aligned}$$

- Find the least number which if divided by 35, 45 and 55 leaves the remainder 18, 28 and 38 respectively.

A - 3448

B - 3458

C - 3468

D - 3478

- Answer : A

Solution:

Here $(35-18) = 17$, $(45-28)= 17$ and $(55- 38) = 17$

Required number = (L.C.M of 35,45, 55)- 17

$$= 3465 -17$$

$$= 3448$$

• The H.C.F of $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$ is

A - $\frac{1}{120}$

B - $\frac{12}{5}$

C - $\frac{100}{3}$

D - $\frac{10}{3}$

• Answer : A

Solution:

$$\text{H.C.F} = \frac{\text{H.C.F of } 1,2,3,4}{\text{L.C.M of } 2,3,4,5}$$

$$= \frac{1}{120}$$

• **The H.C.F of $\frac{2}{3}$, $\frac{8}{9}$, $\frac{10}{27}$, $\frac{32}{81}$.**

A - $\frac{160}{81}$

B - $\frac{160}{3}$

C - $\frac{2}{81}$

D - $\frac{2}{3}$

- Answer: C

Solution:

$$\begin{aligned}\text{H.C.F} &= \text{H.C.F of } 2, 8, 10, 32 / \text{ L.C.M of } 3, 9, 27, 81 \\ &= 2/81\end{aligned}$$

• **Which of the following is a pair of Co-primes?**

A - (14, 35)

B - (18, 25)

C - (31, 93)

D - (32, 62)

- Answer : B

Solution:

H.C.F of 18 and 25 is 1.

\therefore 18 and 25 are co-primes.

• **Three numbers are in the ratio 1:2:3 and their H.C.F is 12. The numbers are?**

A - 11,25,35

B - 12,24,36

C - 11,15,16

D - 12,25,36

- Answer : B

Solution:

Let the required numbers be z , $2z$, and $3z$.

Then, their H.C.F = z

So, $z = 12$.

Therefore The number are 12, 24 and 36.

• Find the L.C.M. of $\frac{2}{3}$, $\frac{2}{5}$ and $\frac{2}{7}$.

A - 2

B - $\frac{2}{3}$

C - $\frac{2}{5}$

D - $\frac{2}{7}$

• Answer : A

Solution:

$$\begin{aligned}\text{L.C.M. of given fractions} &= \frac{\text{L.C.M.of numerators}}{\text{H.C.F.of denominators}} \\ &= \frac{2}{1} = 2\end{aligned}$$

(L.C.M.of numerators = 2, H.C.F.of denominators =1)

- If the sum of two numbers is 175 and the H.C.F. and L.C.M. of these numbers are 35 and 140 respectively, then the sum of the reciprocals of the numbers is equal to:

A - $\frac{1}{24}$

B - $\frac{12}{19}$

C - $\frac{1}{26}$

D - $\frac{1}{28}$

• Answer : D

Solution:

Let the numbers be X and Y.

Then, $X+Y = 175$ and $XY = 35 \times 140 = 4900$.

The required sum $= \frac{1}{X} + \frac{1}{Y} = \frac{X+Y}{XY} = \frac{175}{4900} = 1/28$

- **The sum of two numbers is 45 and difference is $\frac{1}{9}$ of their sum.
What is their L.C.M:**

A - 100

B - 150

C - 200

D - 250

- Answer : A

Solution :

Let the numbers be x and y . Then,

$$\{x+y = 45 \text{ , } x-y = (1/9*45)= 5\} \Rightarrow x = 25, y = 20$$

$$\text{L.C.M of 25 and 20} = (5*5*4)= 100$$

• **What is the greatest length possible of a scale that can be used to measure exactly 3m , 5m 10 cm and 12m 90 cm length?**

A - 10 cm

B - 20 cm

C - 25 cm

D - 30 cm

- Answer : D

Solution:

Required length = H.C.F of 300 cm, 510 cm, 1290 cm
=30 cm

THANK YOU