tcs | NQT

NATIONAL QUALIFIER TEST

2026

APTITUDE 01

TIME & WORK, PIPES & CISTERNS, LCM HCF

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Q)

A = 10 days → $\eta_A = \frac{20 \text{ unit}}{10 \text{ days}} =$ 2 unit/day ✓

B = 20 days → $\eta_B \Rightarrow \frac{20 \text{ unit}}{20 \text{ days}} \Rightarrow$ 1 unit/day ✓

Total work

→ LCM [10, 20]

20 unit ✓

$\eta_A \Rightarrow \frac{\text{Total work}}{\text{No. of days}}$

In how many days (A+B) can complete the same work?

$\eta_A + \eta_B \Rightarrow 2+1 =$ 3 units/day

$(A+B)^{\text{time}} \Rightarrow \frac{20 \text{ unit}}{3 \text{ unit/day}} \Rightarrow 6\frac{2}{3}$ day ✓

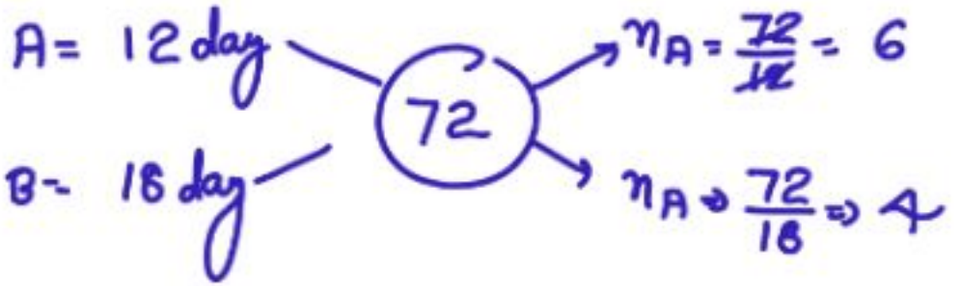
A can do a piece of work in 12 days whereas B can do the same work in 18 days. In how many days (A & B) together can do the same work if they are working together?

(a) $7\frac{2}{5}$

(b) $7\frac{1}{5}$

(c) $8\frac{2}{5}$

(d) $8\frac{1}{5}$



$(A+B) \Rightarrow \frac{72}{(6+4)} = \frac{72^{36}}{10_5} \Rightarrow \frac{36}{5} \Rightarrow 7\frac{1}{5}$ days

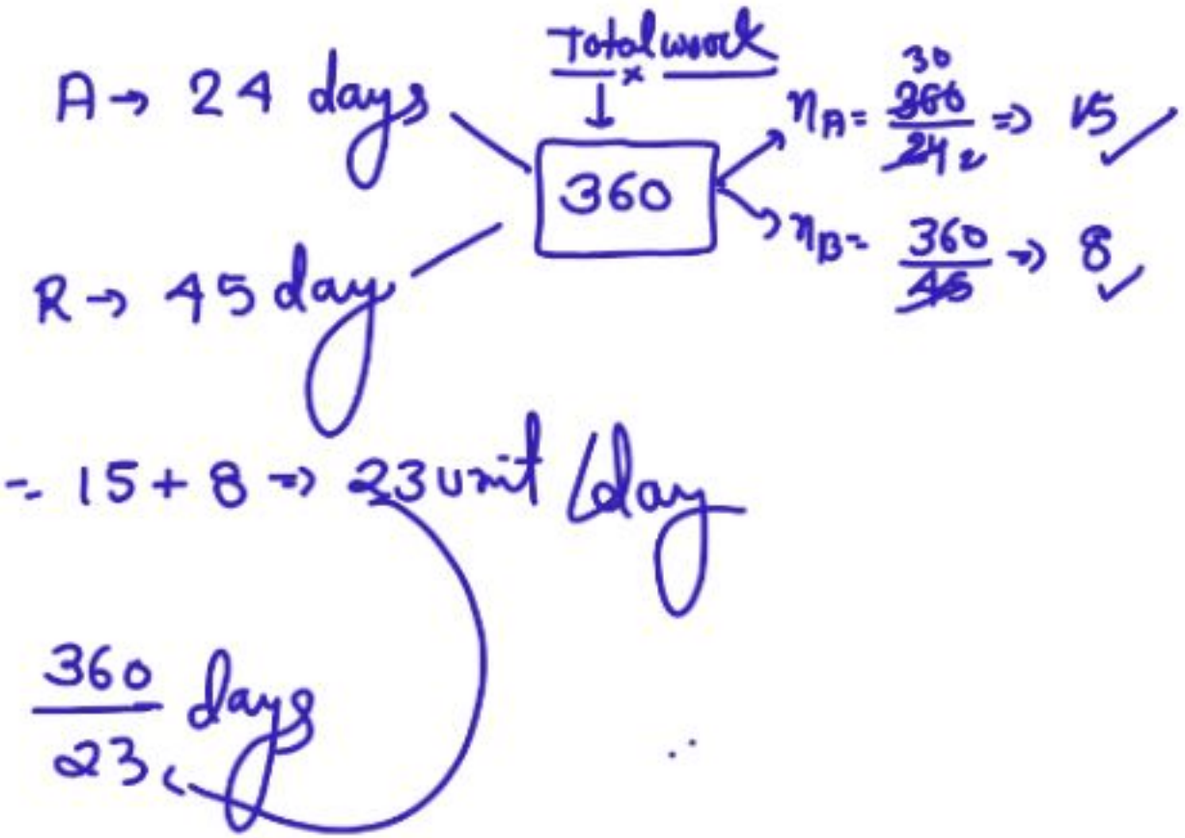
Aditya can do a piece of work in 24 days whereas Raman can do the same work in 45 days. In how many days they can complete the same work together?

(a) $\frac{350}{23}$

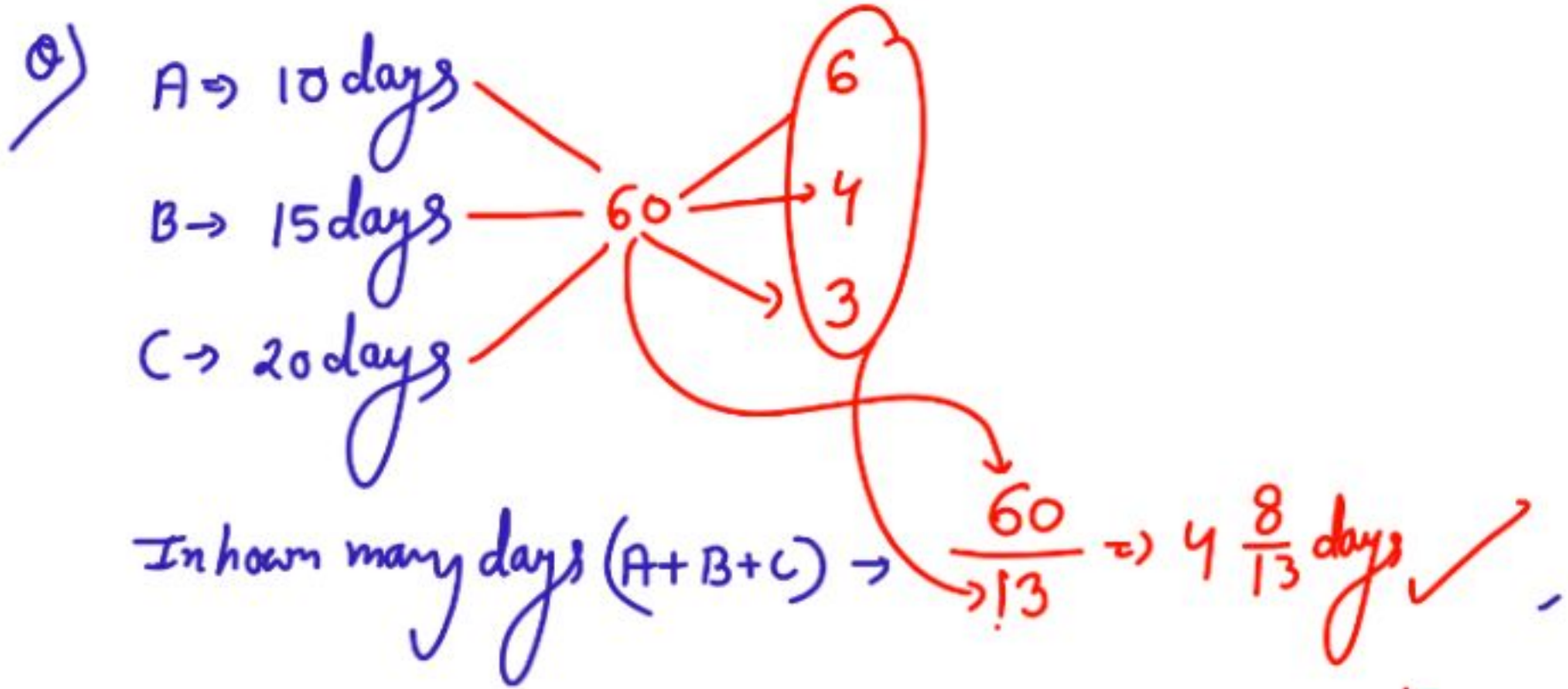
(b) $\frac{360}{23}$

(c) $\frac{350}{33}$

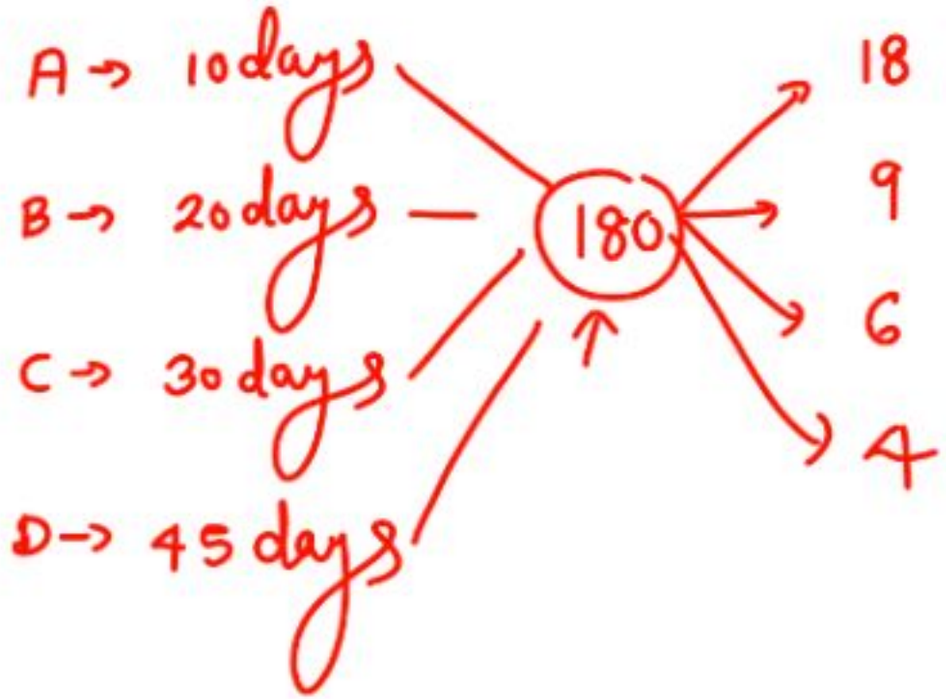
(d) $\frac{360}{37}$



Q)


A → 10 days
B → 15 days
C → 20 days
60
6
4
3
In how many days (A+B+C) →
60/13 ⇒ 4 8/13 days

Q) A → 10 days
B → 20 days
C → 30 days
D → 45 days



LCM [10, 20, 30, 45]

10 = 2 × 5
20 = 2 × 2 × 5
30 = 2 × 3 × 5
45 = 3 × 3 × 5

LCM = 2 × 2 × 3 × 3 × 5 = 180

60, 120, 180, 180

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

$4 \times 9 \times 5 \Rightarrow 180$ ✓

[A+B+C+D] → in how many days → $\frac{180}{37}$ days

LCM [least common multiple] :→

24 → $2^3 \times 3^1$

8 × 3

45 → $3^2 \times 5^1$

9 × 5

↓ ↓

3^2 5^1

** LCM → Select highest power of prime base

LCM → $2^3 \times 3^2 \times 5^1$

$8 \times 9 \times 5 \Rightarrow 360$ ✓

HCF → Select least power of Prime base

$\Rightarrow 3^1 \Rightarrow 3$ ✓

** Prime factorization form

↳ represent a given natural no. in terms of power of prime no.

$a^0 = 1$

$a \neq 0$

Prime NO:→ All natural no. which have exactly two distinct factors are known as prime no.

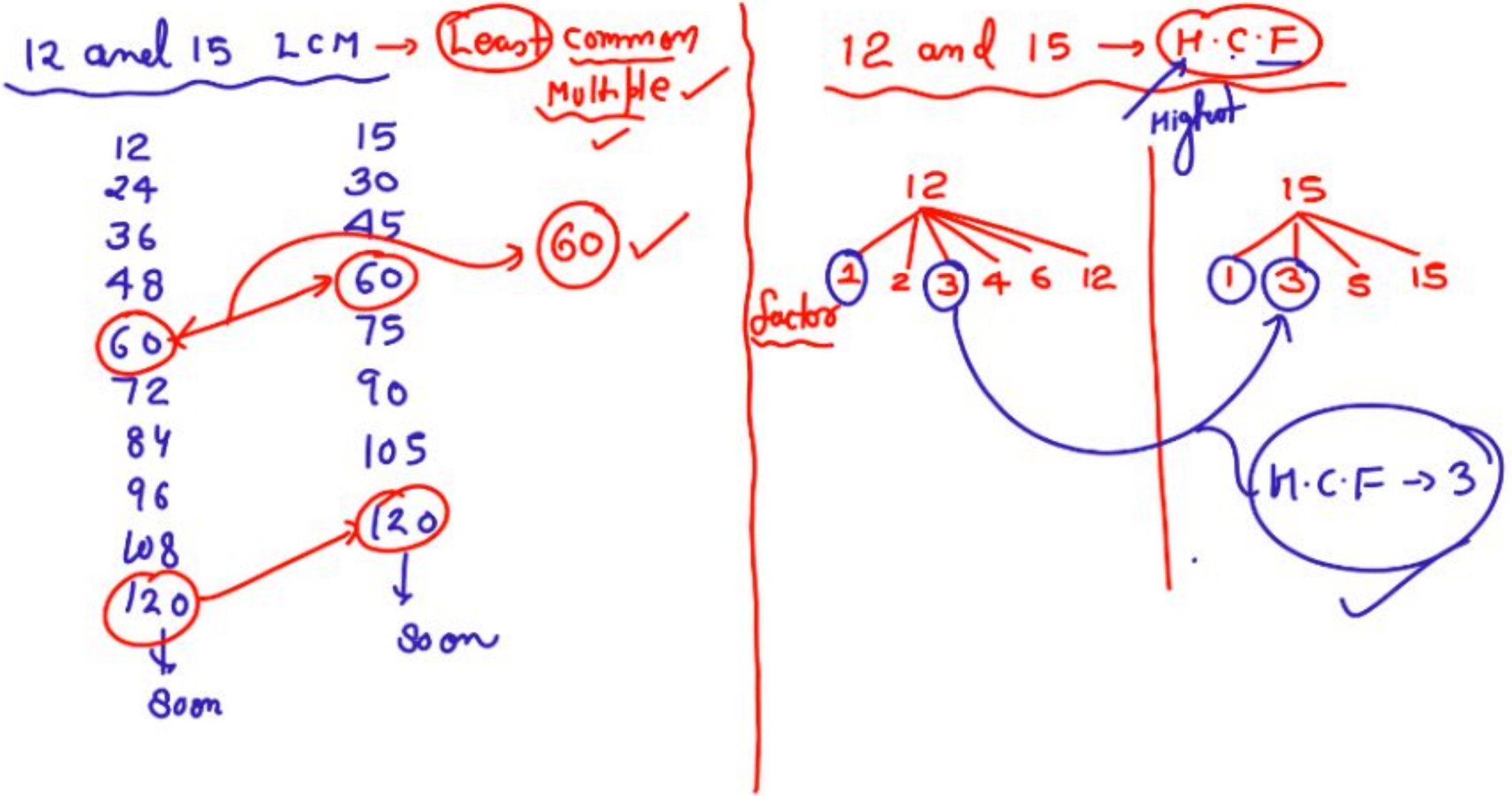
$2 < \begin{matrix}1\\2\end{matrix}$ | $3 < \begin{matrix}1\\3\end{matrix}$ | $5 < \begin{matrix}1\\5\end{matrix}$ | $7 < \begin{matrix}1\\7\end{matrix}$ × $6 < \begin{matrix}1\\2\\3\\6\end{matrix}$ | 1 → (1) ×

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47 → 1-50 → 15 prime No.

53, 59, 61, 67, 71, 73, 79, 83, 89, 97 → 51-100 → 10 prime No.

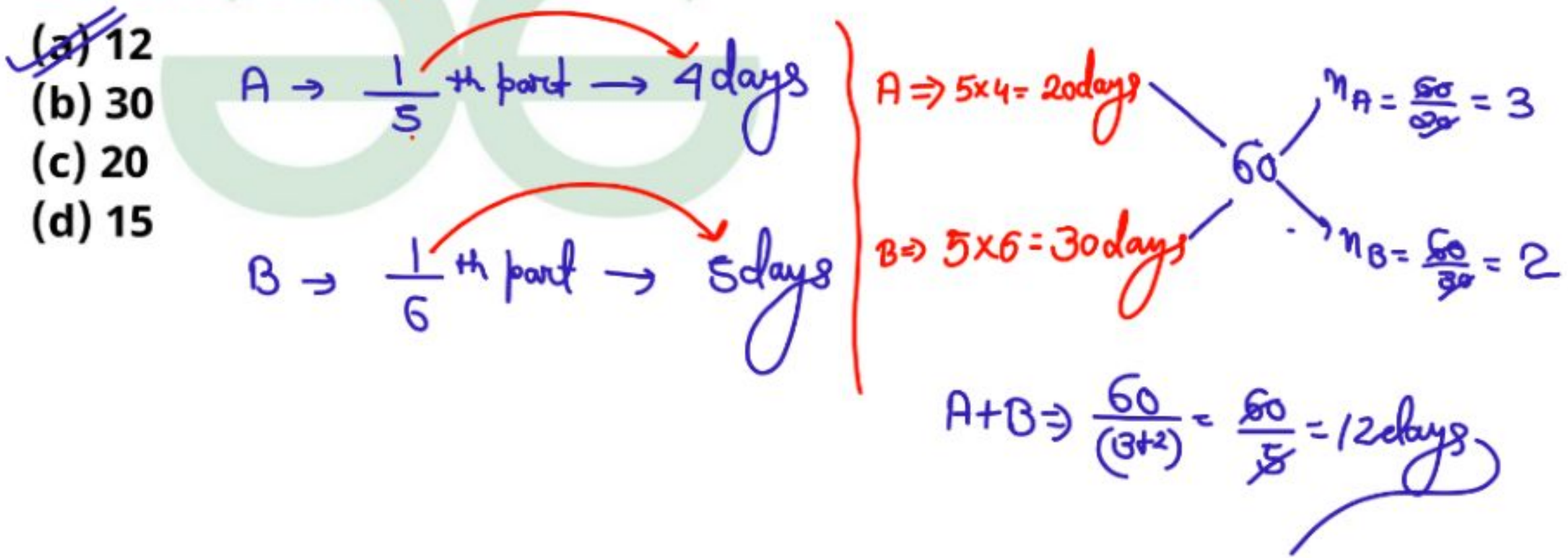
1 to 100 prime → 25 prime No. / 101-200 → 21 prime No.

Natural No:→ All +ve integers / [1, 2, 3, 4, 5, 6, 7, ---- so on]


12 and 15 LCM → Least common Multiple
12
24
36
48
60
72
84
96
108
120
8oon
15
30
45
60
75
90
105
120
8oon
60
12 and 15 → H·C·F
Highest
12
1
2
3
4
6
12
Factor
15
1
3
5
15
H·C·F → 3

A can do one fifth part of a task in 4 days, B can do one sixth part of the same work in 5 days. If they work together, then in how many days can this task be completed?

(a) 12
(b) 30
(c) 20
(d) 15



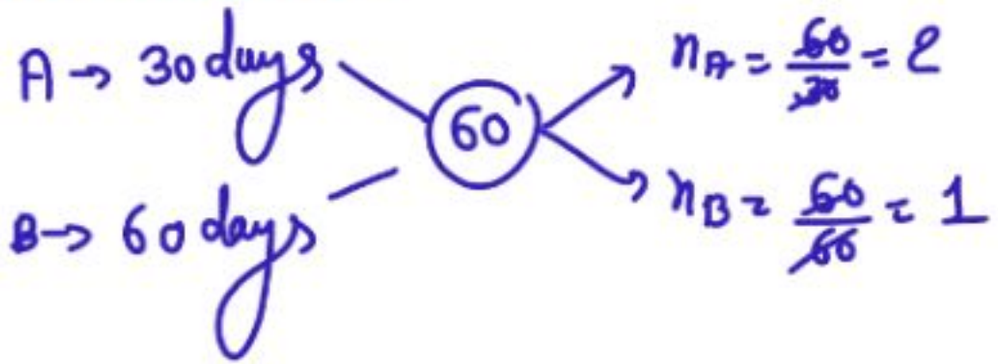
A alone can do a work in 30 days. B alone can do the same work in 60 days. If they work together for 5 days, then what part of the work will be left?

(a) $\frac{2}{3}$

(b) $\frac{1}{2}$

(c) $\frac{3}{4}$

(d) $\frac{5}{6}$



In 5 days (A+B) complete how many unit

$\Rightarrow (n_A + n_B) \times 5$

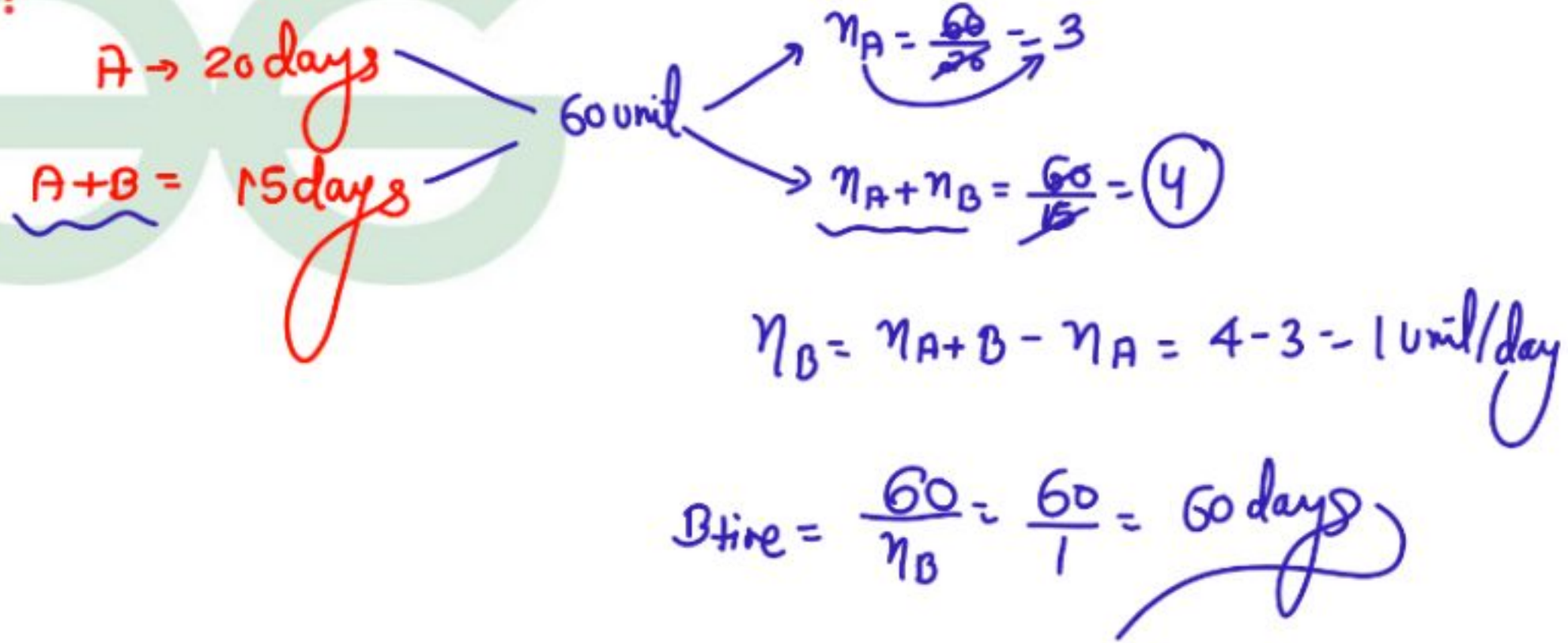
$\Rightarrow (2+1) \times 5 \Rightarrow 15$ unit

Remaining unit $\Rightarrow 60 - 15 \Rightarrow 45$ unit

$\Rightarrow \frac{45 \text{ unit}}{60 \text{ unit}} \Rightarrow \frac{3}{4}$

If A can do a piece of work in 20 days whereas (A & B) together can do the same piece of work in 15 days. In how many days B alone can do the same work?

(a) 60
(b) 80
(c) 50
(d) 32



A and B can complete a work in 15 days and 10 days respectively. They started doing the work together but after 4 days B had to leave. Then A working with a new worker C completed the remaining work in 3 days. If C works alone, in how many days he can do 40% of the same work?

(a) 9
(b) 8
(c) 10
(d) $8\frac{1}{2}$

Part 1

A = 15 days, B = 10 days

LCM = 30 unit

$\eta_A = \frac{30}{15} = 2$

$\eta_B = \frac{30}{10} = 3$

Part 2

A+B for 4 days | A+C for 3 days

$(\eta_{A+B}) \times 4$

$[2+3] \times 4$

20 unit

Remaining unit

$\Rightarrow 30 - 20 = 10$ unit

10 unit

$(\eta_A + \eta_C) \times 3 = 10$ unit

$(2 + \eta_C) = 10/3$

$\eta_C = \frac{10}{3} - 2 \Rightarrow 4/3$ unit/day

$\frac{10}{3} - \frac{2}{1}$

$\frac{10-6}{3} = 4/3$

Part 3

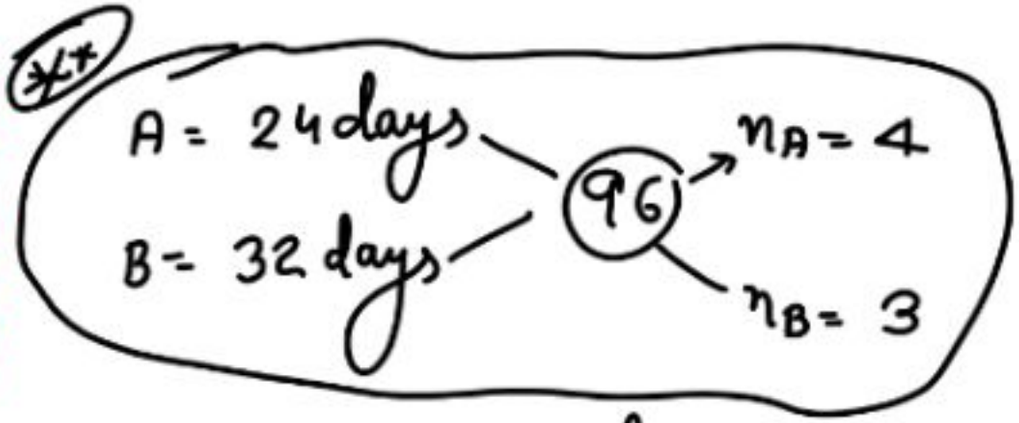
90% of total work $\Rightarrow \frac{2}{5} \times 30 = 12$ unit

$\eta_C = 4/3$ unit/day

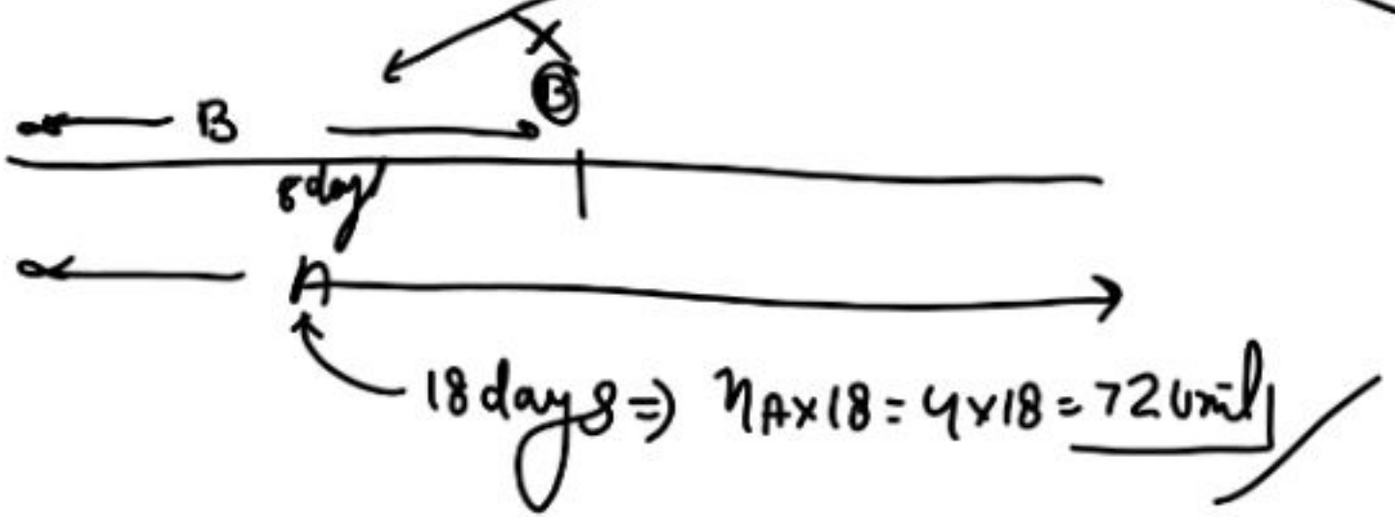
$\text{Time} = \frac{12}{4/3} = \frac{12 \times 3}{4} = 9$ days

A can complete a work in 24 days B can complete the same work in 32 days. If they work together and after certain time B left the work and A completed the remaining work. Then total work be completed in 18 days. After how many days B left the work.

(a) 6 days
(b) 8 days
(c) 10 days
(d) 12 days



96 - 72 ⇒ 24 unit



$B_{time} = \frac{24}{3} = 8$ days

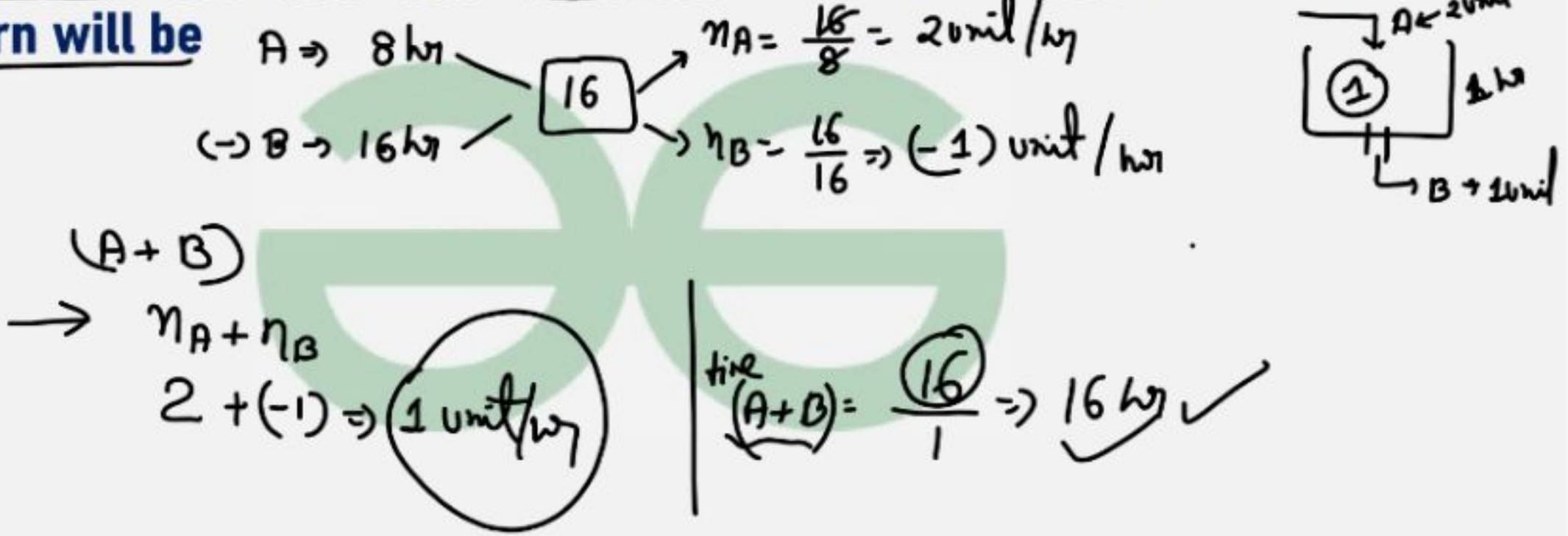
Q A tap can fill a cistern in 8 hours and another can empty can empty in 16 hours. If both the taps are opened simultaneously the time (in hours) to fill the cistern will be

(A) 8

(B) 10

(C) 16

(D) 24



Q A cistern has two taps which fill it in 12 min and 15 respectively. There is also a waste pipe in the cistern. When all piece are opened, the empty cistern is full in 20 min. How long will the waste pipe take to empty a full cistern?

(A) 12 m
(B) 10 m
(C) 8 m
(D) 16 m

A = 12 Min

B = 15 Min

(A+B+C) ⇒ 20 Min fill

60 unit

$n_A = 5$

$n_B = 4$

$n_{A+B+C} = \frac{60}{20} = (+3)$

$+3 = n_A + n_B + n_C$

$+3 = 5 + 4 + n_C$

$-6 = n_C$

C time ⇒ $\frac{60}{-6} = 10$ Min

Q Pipe A can fill a tank in 12 hours where as Pipe B can empty the same tank in 20 hours. If both the pipes are operating simultaneously, then in how many hours, half of the tank gets filled?

(A) 12

(B) 15

(C) 10

(D) 18

Try Yourself

What is the HCF of $2^3 \times 3^4$ and $2^5 \times 3^2$?

(a) $2^5 \times 3^3$

(b) $2^3 \times 3^4$

(c) $2^3 \times 3^2$

(d) $2^5 \times 3^4$

$2^3 \times 3^4$ $\quad$ $2^5 \times 3^2$

$\times$ ← LCM

$2^3 \times 3^2$ ← H.C.F

Find LCM of 48, 50, 98, 54 and 72.

(a) $2^4 \times 3^3 \times 5^2 \times 7^2$

(b) $2^3 \times 3^3 \times 5^2 \times 7^2$

(c) $2^4 \times 3^2 \times 5^2 \times 7^2$

(d) $2^3 \times 3^3 \times 5 \times 7$

Select highest power

Find the LCM of 15, 24, 32 & 45.

~~(a) 1448~~

~~(b) 1436~~

(c) 1435

(d) 1440

LCM →

How to find LCM and H.C.F of fraction

$$\text{LCM}\left[\frac{a}{b}, \frac{c}{d}, \frac{e}{f}\right] \Rightarrow \frac{\text{LCM}[a, c, e]}{\text{HCF}[b, d, f]}$$

$$\text{HCF}\left[\frac{a}{b}, \frac{c}{d}, \frac{e}{f}\right] \Rightarrow \frac{\text{HCF}[a, c, e]}{\text{LCM}[b, d, f]}$$

Find L.C.M and H.C.F of $\left[\frac{4}{15}, \frac{7}{30}, \frac{9}{45}\right]$

Sol) LCM $\Rightarrow \frac{\text{LCM}[4, 7, 9]}{\text{HCF}[15, 30, 45]}$

$\Rightarrow \frac{252}{15}$ ✓

HCF $\Rightarrow \frac{\text{HCF}[4, 7, 9]}{\text{LCM}[15, 30, 45]}$

$\Rightarrow \frac{1}{90}$ ✓

What is the LCM of 3.6, 1.8 and 0.144?

(a) 36
(b) 360
(c) 3.6
(d) 3600

exam type ✗

⇒ 3.6 , 1.8 , of 144

fraction → $\frac{36\times100}{10\times100}$, $\frac{18\times100}{10\times100}$, $\frac{144}{1000}$

$\frac{3600}{1000}$, $\frac{1800}{1000}$, $\frac{144}{1000}$

$$\frac{LCM[3600, \overset{\times}{1800}, \overset{\times}{144}]}{H.C.F[1000, 1000, 1000]} = \frac{3600}{1000} \Rightarrow 3.6$$ ✓

Two numbers are in the ratio 7:11. If their HCF is 28, then the sum of the two numbers is:

(a) 196
(b) 504
(c) 112
(d) 308

$N_1 : N_2$

$7 : 11$

$7 \times 28 , 11 \times 28$

$N_1 + N_2 = 7 \times 28 + 11 \times 28$

$\Rightarrow 28 \times 18$

$\Rightarrow 28 \times 18$

$\Rightarrow$ — 4 ✓

A B

20 : 25

4 : 5 ✓

$4 \times 8 : 5 \times 8$

4 : 5

$7656 \times 7163 \times 6353 \times 4167$

Last digit ?

— 2

The traffic lights at 3 different road crossings change after every 48 sec, 72 sec and 108 sec, respectively. If they all change simultaneously at 8:20 a.m., then at what tiem will they next change again simultaneously?

(a) 8:27:12 a.m.
(b) 8:33:32 a.m.
(c) 9:12:18 a.m.
(d) 8:40:14 a.m.

8:20:00 + 00:07:12

↓

8:27:12 AM

LCM [48, 72, 108]

$48 \Rightarrow 2^4 \times 3$

$72 \Rightarrow 2^3 \times 3^2$

$108 \Rightarrow 2^2 \times 3^3$

LCM $2^4 \times 3^3$

$\Rightarrow 16 \times 27 \Rightarrow$ 43 28sec

60 | 432 | 7
420
12

7Min 12Sec