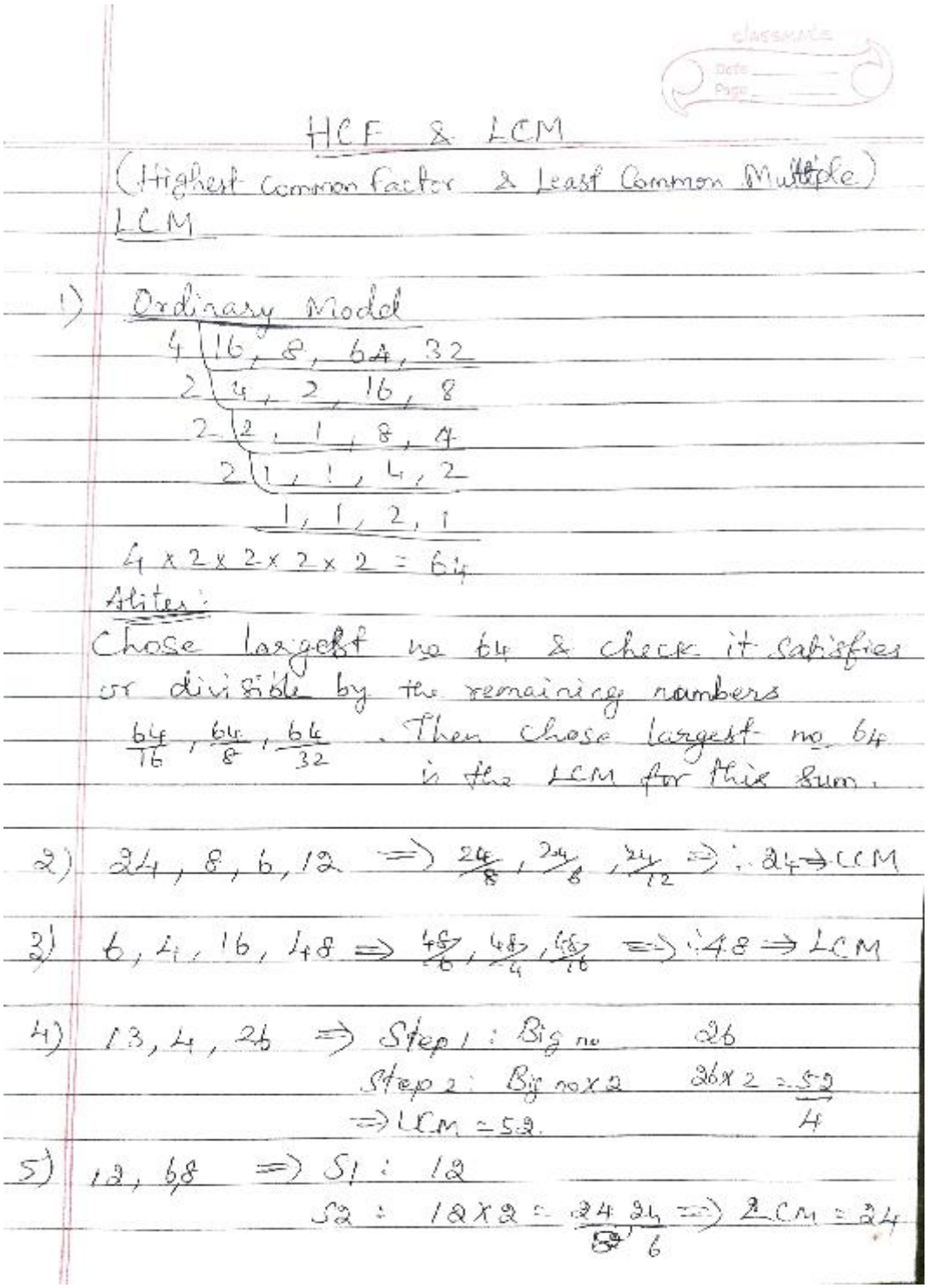


HCF & LCM

(Highest Common Factor & Least Common Multiple)

LCM

1) Ordinary Model

4 | 16, 8, 64, 32

2 | 4, 2, 16, 8

2 | 2, 1, 8, 4

2 | 1, 1, 4, 2

1, 1, 2, 1

$4 \times 2 \times 2 \times 2 \times 2 = 64$

Note:

Chose largest no 64 & check it satisfies or divisible by the remaining numbers

$\frac{64}{16}, \frac{64}{8}, \frac{64}{32}$. Then chose largest no 64 is the LCM for this sum.

2) 24, 8, 6, 12 $\Rightarrow \frac{24}{8}, \frac{24}{6}, \frac{24}{12} \Rightarrow \therefore 24 \Rightarrow$ LCM

3) 6, 4, 16, 48 $\Rightarrow \frac{48}{6}, \frac{48}{4}, \frac{48}{16} \Rightarrow \therefore 48 \Rightarrow$ LCM

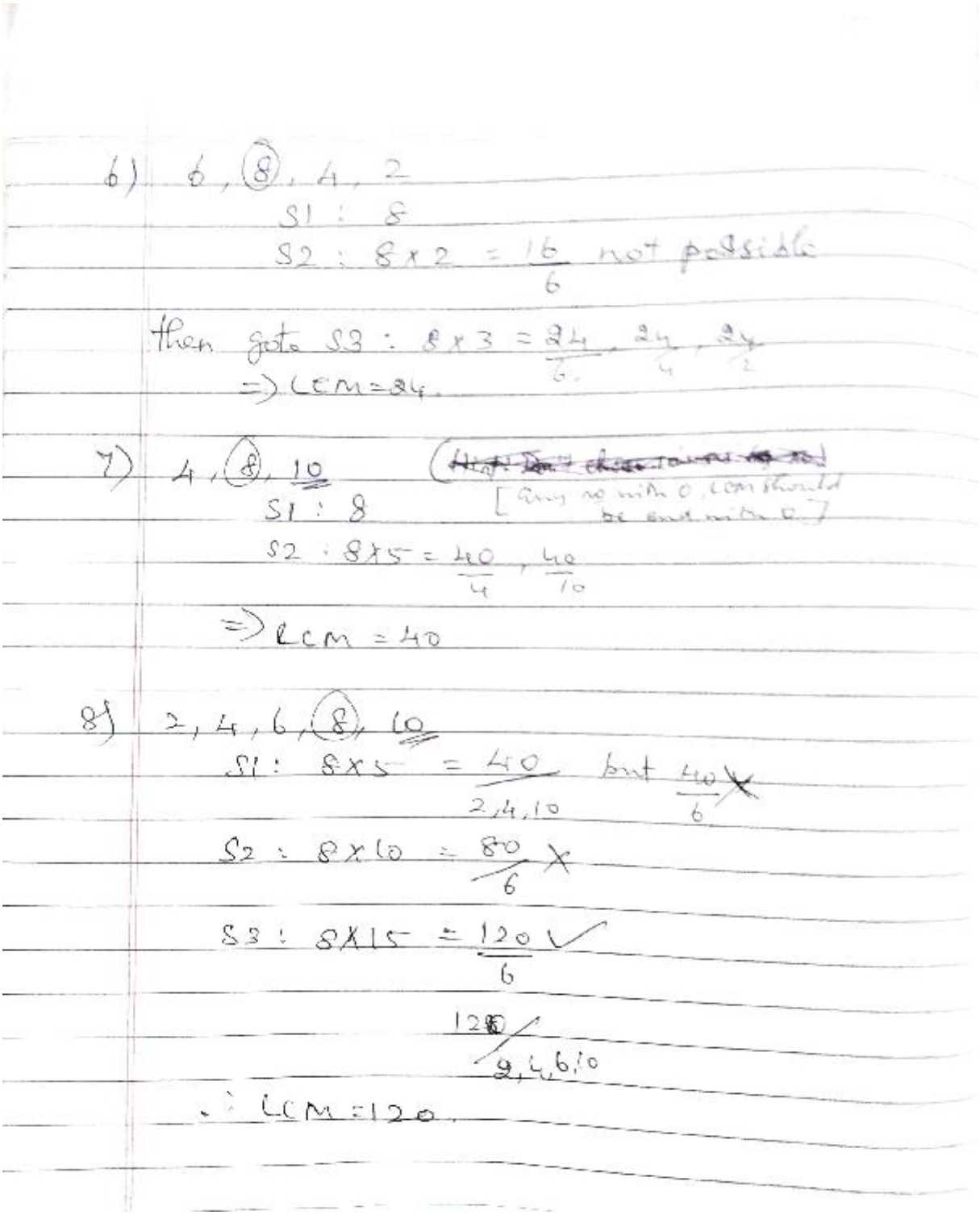
4) 13, 4, 26 $\Rightarrow$ Step 1 : Big no 26

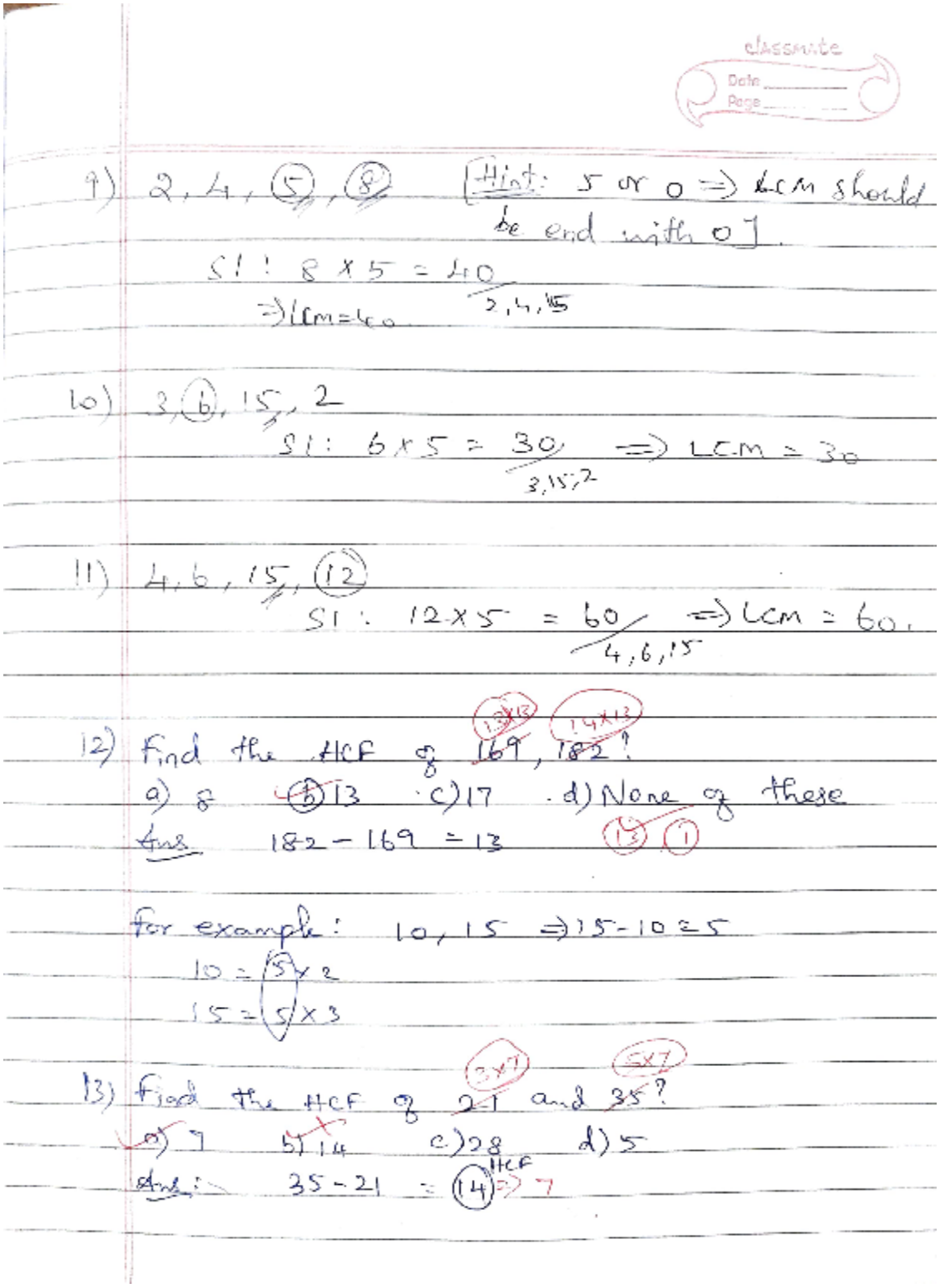
Step 2 : Big no x 2 $26 \times 2 = 52$

$\Rightarrow$ LCM = 52. 4

5) 12, 68 $\Rightarrow$ S1 : 12

S2 : $12 \times 2 = 24$ $\frac{24}{8}, \frac{24}{6} \Rightarrow$ LCM = 24


6) 6, (8), 4, 2
S1 : 8
S2 : 8 x 2 = 16/6 not possible
then goto S3 : 8 x 3 = 24/6, 24/4, 24/2
=> LCM = 24.
7) 4, (8), 10
S1 : 8
S2 : 8 x 5 = 40/4, 40/10
=> LCM = 40
8) 2, 4, 6, (8), 10
S1 : 8 x 5 = 40/2,4,10 but 40/6 X
S2 : 8 x 10 = 80/6 X
S3 : 8 x 15 = 120/6 ✓
120/2,4,6,10
∴ LCM = 120.



9) 2, 4, 5, 8 [Hint: 5 or 0 ⇒ LCM should be end with 0]

S1 : 8 × 5 = 40 / 2, 4, 5

⇒ LCM = 40

10) 3, 6, 15, 2

S1 : 6 × 5 = 30 / 3, 15, 2 ⇒ LCM = 30

11) 4, 6, 15, 12

S1 : 12 × 5 = 60 / 4, 6, 15 ⇒ LCM = 60.

12) Find the HCF of 169, 182?

a) 8 b) 13 c) 17 d) None of these

Ans: 182 − 169 = 13

for example: 10, 15 ⇒ 15 − 10 = 5

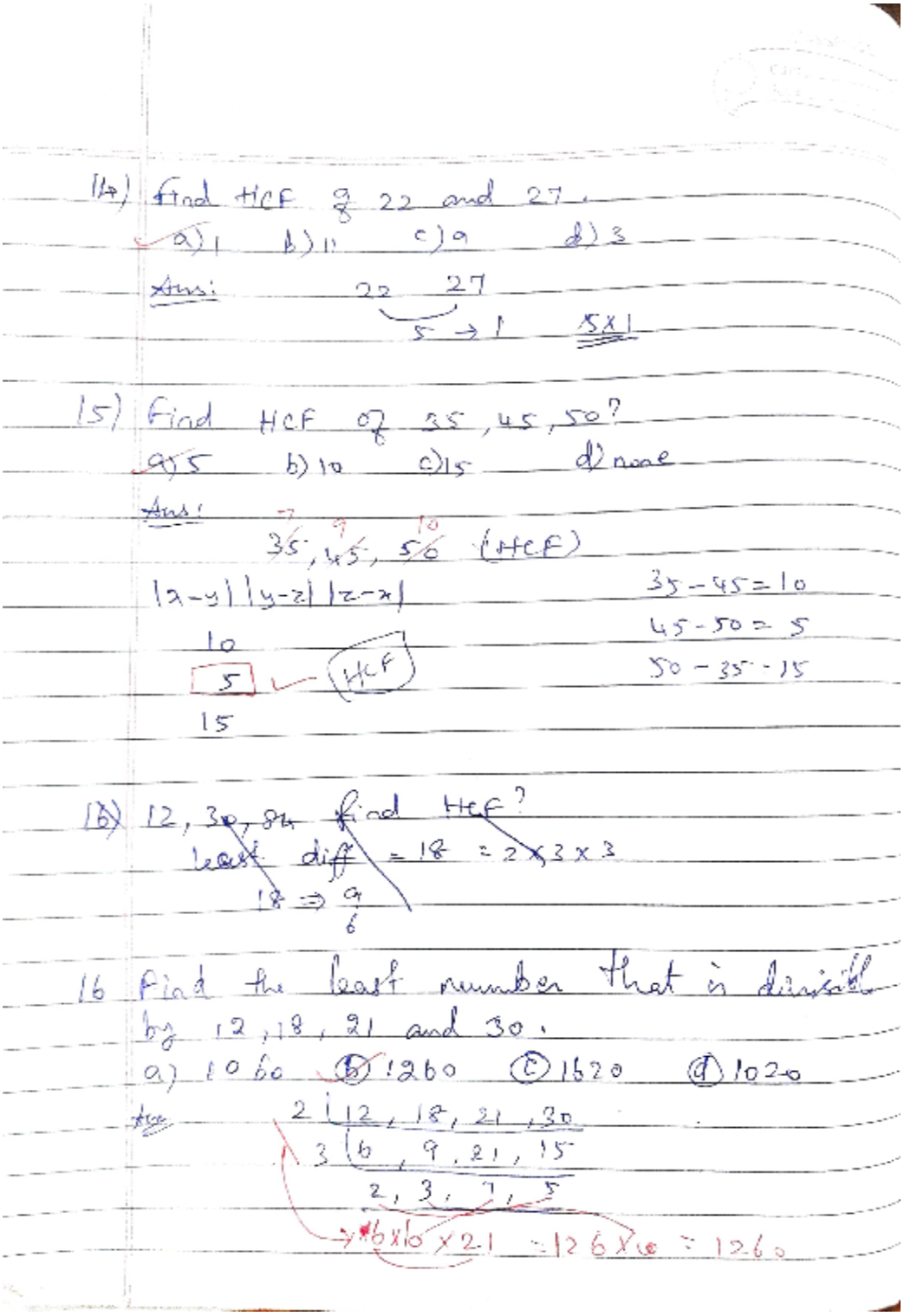
10 = 5 × 2

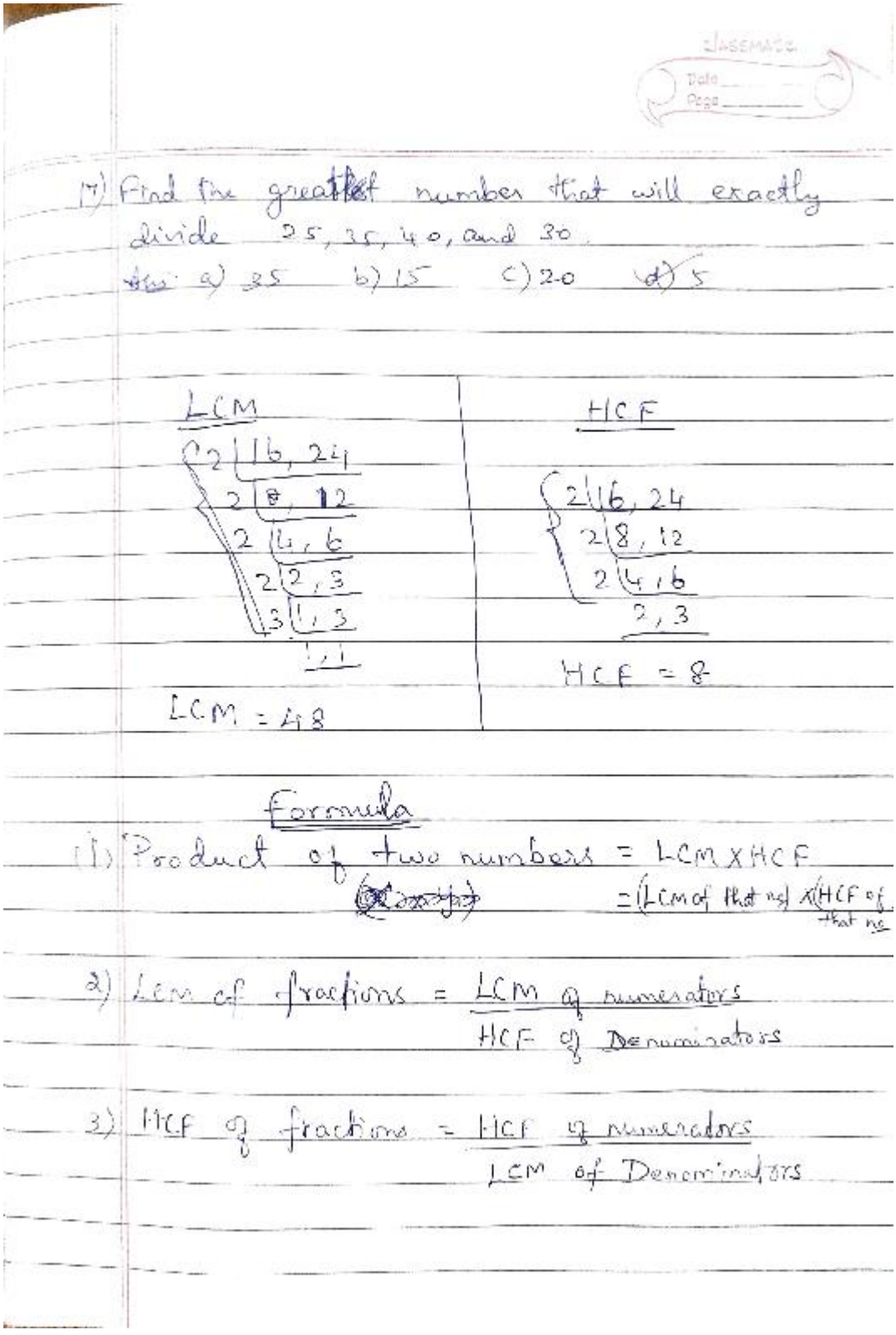
15 = 5 × 3

13) Find the HCF of 21 and 35?

a) 7 b) 14 c) 28 d) 5

Ans: 35 − 21 = 14 ⇒ 7 (HCF)


14) Find HCF of 22 and 27.
a) 1 b) 11 c) 9 d) 3
Ans: 22 27
5 → 1 5x1
15) Find HCF of 35, 45, 50?
a) 5 b) 10 c) 15 d) none
Ans:
35, 45, 50 (HCF)
|x-y| |y-z| |z-x|
35-45=10
45-50=5
50-35=15
10
5 (HCF)
15
16) 12, 30, 84 find HCF?
least diff = 18 = 2x3x3
18 ⇒ 9
6
16 Find the least number that is divisible by 12, 18, 21 and 30.
a) 1060 b) 1260 c) 1620 d) 1020
Ans
2 | 12, 18, 21, 30
3 | 6, 9, 21, 15
2, 3, 7, 5
2x3x7x5 = 126x10 = 1260



7) Find the greatest number that will exactly divide 25, 35, 40, and 30.

a) 25 b) 15 c) 20 d) 5

LCM

2 | 16, 24
2 | 8, 12
2 | 4, 6
2 | 2, 3
3 | 1, 3
| 1, 1

LCM = 48

HCF

2 | 16, 24
2 | 8, 12
2 | 4, 6
| 2, 3

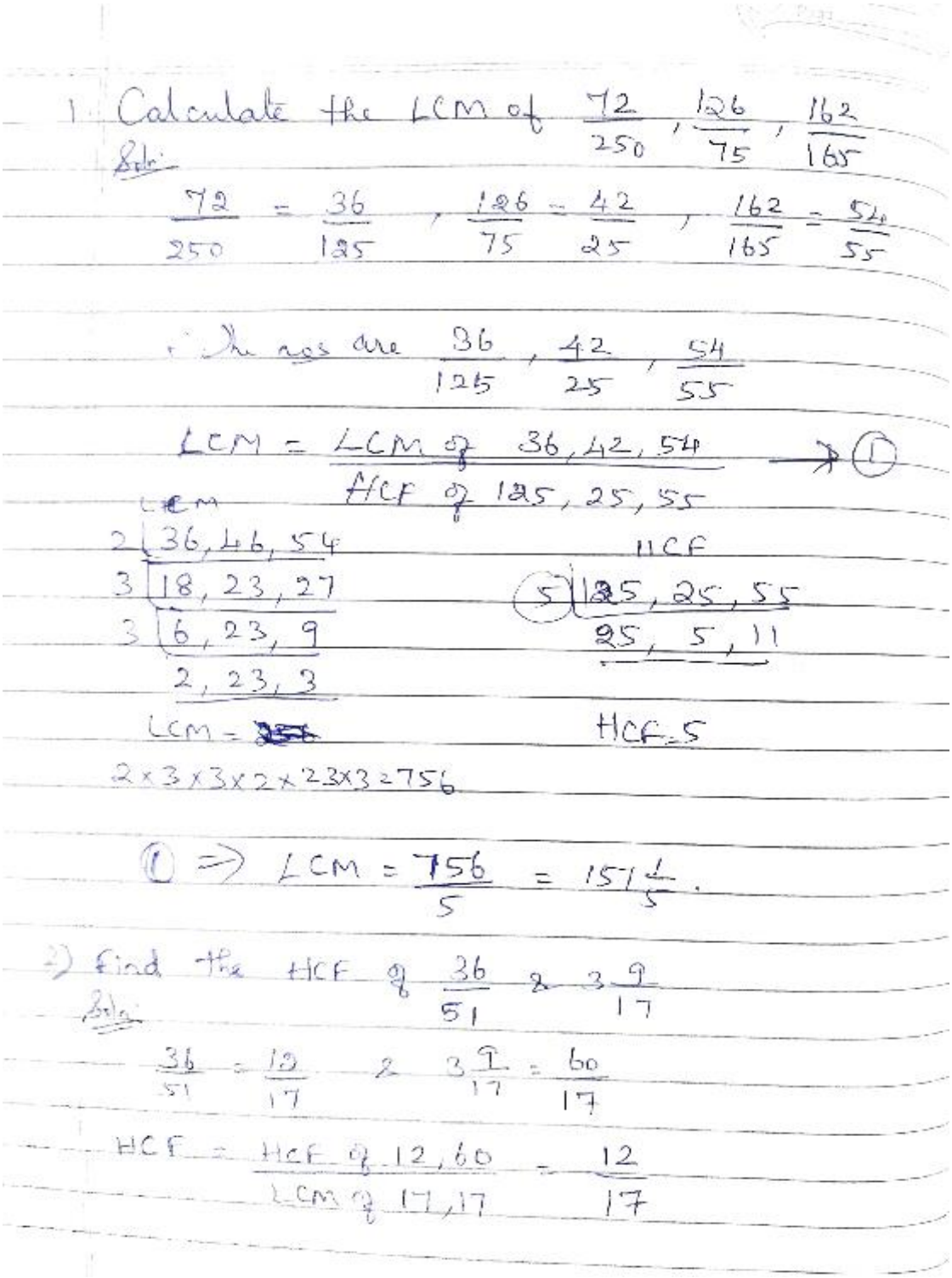
HCF = 8

Formula

1) Product of two numbers = LCM × HCF
= (LCM of that no) × (HCF of that no)

2) Lcm of fractions = $\frac{\text{LCM of numerators}}{\text{HCF of Denominators}}$

3) HCF of fractions = $\frac{\text{HCF of numerators}}{\text{LCM of Denominators}}$



1. Calculate the LCM of $\frac{72}{250}, \frac{126}{75}, \frac{162}{165}$

Sol:

$\frac{72}{250} = \frac{36}{125}$, $\frac{126}{75} = \frac{42}{25}$, $\frac{162}{165} = \frac{54}{55}$

∴ The nos are $\frac{36}{125}, \frac{42}{25}, \frac{54}{55}$

$LCM = \frac{LCM \text{ of } 36, 42, 54}{HCF \text{ of } 125, 25, 55}$ → (1)

LCM

2 | 36, 42, 54

3 | 18, 23, 27

3 | 6, 23, 9

2, 23, 3

LCM = ~~356~~

$2 \times 3 \times 3 \times 2 \times 23 \times 3 = 756$

HCF

5 | 125, 25, 55

25, 5, 11

HCF = 5

(1) ⇒ $LCM = \frac{756}{5} = 151\frac{1}{5}$.

2) Find the HCF of $\frac{36}{51}$ & $3\frac{9}{17}$

Sol:

$\frac{36}{51} = \frac{12}{17}$ & $3\frac{9}{17} = \frac{60}{17}$

$HCF = \frac{HCF \text{ of } 12, 60}{LCM \text{ of } 17, 17} = \frac{12}{17}$

3. Find the LCM of 0.6, 9.6, 0.12

Sol:

$0.6, 9.6, 0.12 \simeq \frac{6}{10}, \frac{96}{10}, \frac{12}{100}$

$LCM = \frac{\text{LCM of numerators}}{\text{HCF of denominators}}$

$= \frac{\text{LCM of } 6, 96, 12}{\text{HCF of } 10, 10, 100}$

$= \frac{96}{10} = 9.6$

2	6, 96, 12
2	3, 48, 6
3	3, 24, 3
8	1, 8, 1
	1, 1, 1

LCM = 96

4) The LCM of 2 nos is 2079 and their HCF is 27. If the 1st no is 189, then find the 2nd no.

Sol:

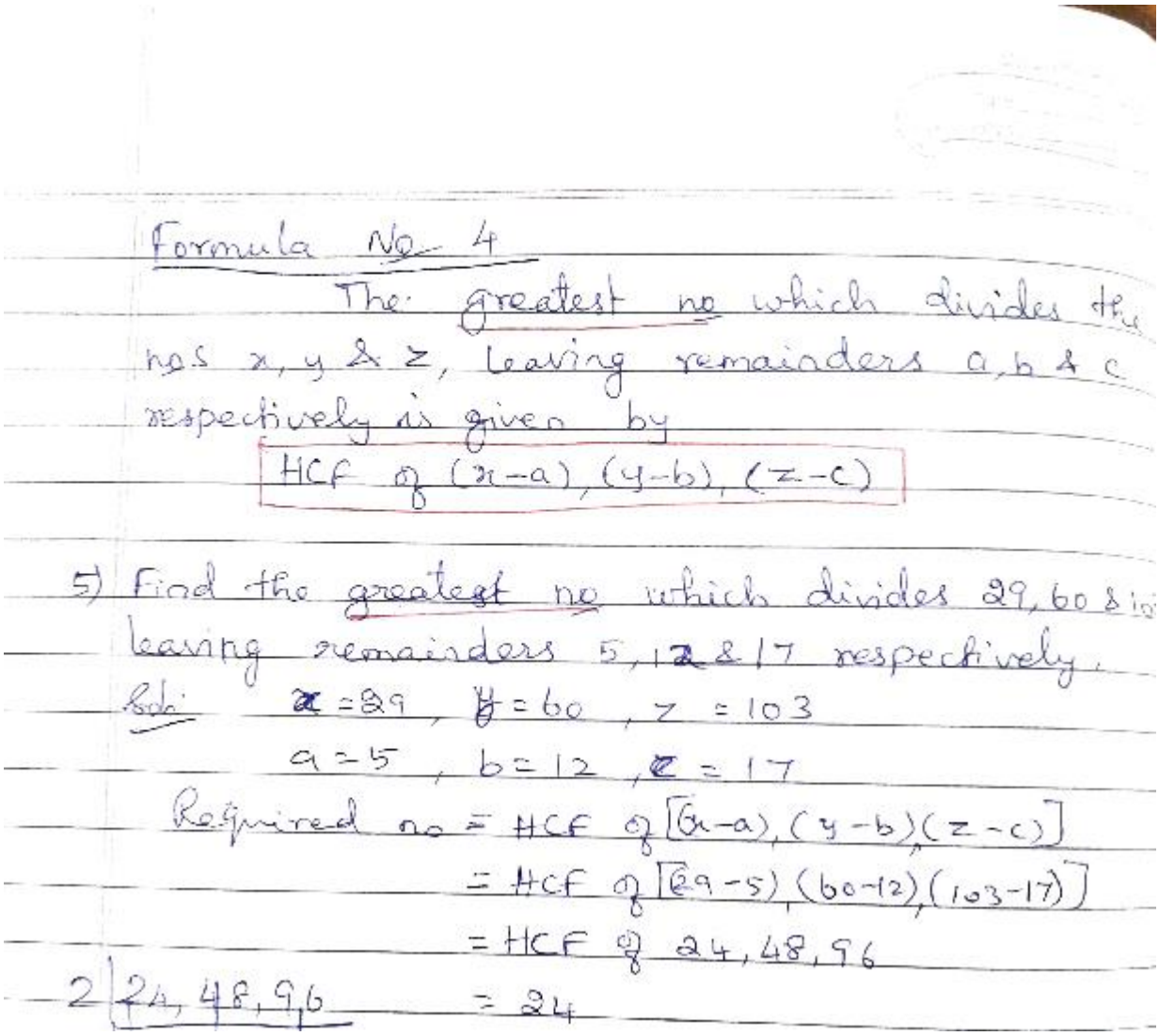
LCM = 2079, HCF = 27

1st no = 189, 2nd no = ?

Product of two nos = HCF × LCM

$189 \times x = 2079 \times 27$

$x = \frac{2079 \times 27}{189} = 297$



Formula No. 4

The greatest no which divides the nos x, y & z, leaving remainders a, b & c respectively is given by

HCF of $(x-a), (y-b), (z-c)$

5) Find the greatest no which divides 29, 60 & 103 leaving remainders 5, 12 & 17 respectively.

Sol: $x = 29$, $y = 60$, $z = 103$

$a = 5$, $b = 12$, $c = 17$

Required no = HCF of $[(x-a), (y-b), (z-c)]$

= HCF of $[(29-5), (60-12), (103-17)]$

= HCF of 24, 48, 96

2 | 24, 48, 96 = 24

Formula No. 5

The least no which when divided by x, y & z leaves the remainders a, b & c respectively, is given by [Lcm of (x,y,z)] - K, where, K = (x-a) = (y-b) = (z-c)

6) Find the least number which when divided by 24, 32 & 36 leaves the remainders 19, 27 & 31, respectively.

Sol:

x = 24, y = 32, z = 36

a = 19, b = 27, c = 31

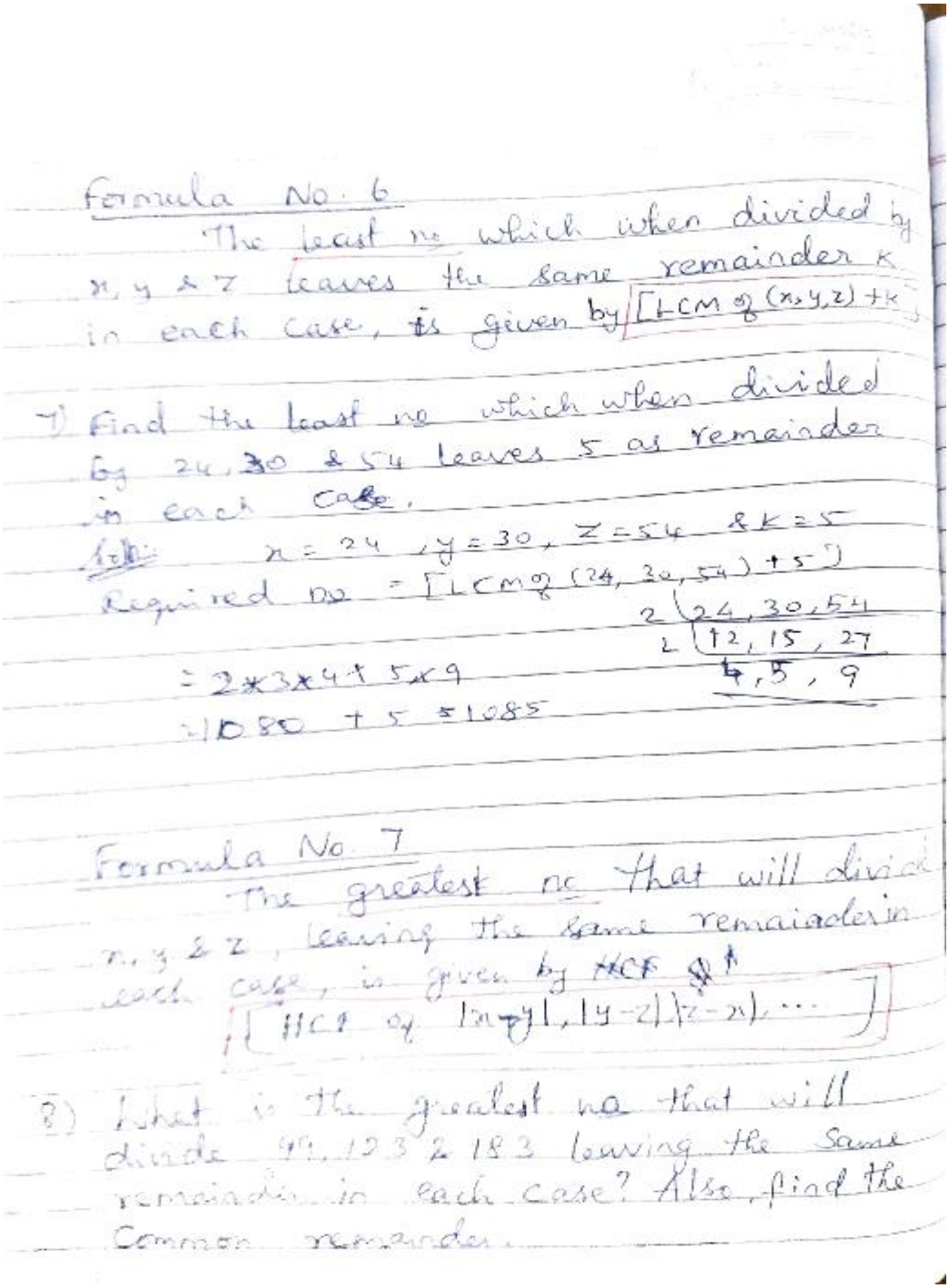
x - a = 24 - 19 = 5
y - b = 32 - 27 = 5
z - c = 36 - 31 = 5
⇒ K = 5

∴ Required no = (LCM of 24, 32, 36) - 5

= (2 × 2 × 2 × 3 × 4 × 3) - 5

= 288 - 5 = 283 //

2 | 24, 32, 36
2 | 12, 16, 18
2 | 6, 8, 9
3 | 3, 4, 9
1, 4, 3



Formula No. 6

The least no which when divided by x, y & z leaves the same remainder k in each case, is given by [LCM of (x,y,z) + k]

7) Find the least no which when divided by 24, 30 & 54 leaves 5 as remainder in each case.

Sol: x = 24, y = 30, z = 54 & k = 5

Required no = [LCM of (24, 30, 54) + 5]

2 | 24, 30, 54
2 | 12, 15, 27
4, 5, 9

= 2*3*4*5*9

= 1080 + 5 = 1085

Formula No. 7

The greatest no that will divide x, y & z, leaving the same remainder in each case, is given by HCF of [|x-y|, |y-z|, |z-x|, ...]

8) What is the greatest no that will divide 92, 123 & 183 leaving the same remainder in each case? Also, find the common remainder.

$x = 99, y = 123, z = 183$

$|x-y| = |99-123| = 24$

$|y-z| = |123-183| = 60$

$|z-x| = |183-99| = 84$

∴ The Required no = HCF of $24, 60, 84 = 12$

2	24, 60, 84
2	12, 30, 42
3	6, 15, 21
	2, 5, 7

The common remainder

$\frac{99}{12} = 8\frac{3}{12}$, $\frac{123}{12} = 10\frac{3}{12}$, $\frac{183}{12} = 15\frac{3}{12}$

$\Rightarrow$ Common remainder = 3.