Exercise 8(c)

1. Using the common multiple method, find the LCM of the following: Name-Pooja Nath, Class-VI Sec 'D', School NC-4556

i) 8, 12 and 24

Ans- The ~~common~~ multiples of 8, 12 and 24 are -

M_8 - 8, 16, (24), 32, 40, (48), 56, 64, (72), 80.....

M_{12} - 12, (24), 36, (48), 60, (72), 84.....

M_{24} - (24), (48), (72), 96, 120, 144.....

Common multiples of 8, 12 and 24 are 24, 48, 72.....

LCM ~~of 24~~ 8, 12 and 24 = 24

ii) 10, 15 and 20

Ans- The ~~common~~ multiples of 10, 15 and 20 are -

M_{10} = 10, 20, 30, 40, 50, (60), 70, 80.....

M_{15} = 15, 30, 45, (60), 75, 90.....

M_{20} = 20, 40, (60), 80, 100, 120.....

LCM of 10, 15 and 20 = 60

iii) 3, 6, 9 and 12

Ans- $M_3 = 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, (36), 39 \ldots\ldots$

$M_6 = 6, 12, 18, 24, 30, (36), 42 \ldots\ldots$

$M_9 = 9, 18, 27, (36), 45, 54, 63 \ldots\ldots$

$M_{12} = 12, 24, (36), 48, 60, 72, 84 \ldots\ldots$

LCM of 3, 6, 9 and 12 = 36

2. Find the LCM of each of the following groups of numbers, using i) Prime factor method and ii) the Common division method:

i) 18, 24 and 96

Ans- By using prime factor, LCM of 18, 24 and 96 =

Prime factors of $18 = 2 \times 3 \times 3$

$= 2 \times 3^2$

Prime factors of $24 = 2 \times 2 \times 2 \times 3$

$= 2^3 \times 3$

Prime factors of $96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$

$= 2^5 \times 3$

$LCM = 2^5 \times 3^2$

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

$= 288$

- By using common division method LCM of 18, 24 and 96 =

LCM =

2	18, 24, 96
2	9, 12, 48
2	9, 6, 24
3	9, 3, 12
2	3, 1, 4
	3, 1, 2

$LCM = 2 \times 2 \times 2 \times 3 \times 2 \times 3 \times 2 = 288$

ii) 100, 150 and 200

Ans- By using Prime factor method, LCM of 100, 150 and 200-

$100 = 2 \times 5 \times 2 \times 5$

$= 2^2 \times 5^2$

$150 = 5 \times 5 \times 2 \times 3$

$= 5^2 \times 3 \times 2$

$200 = 2 \times 2 \times 2 \times 5 \times 5$

$= 5^2 \times 2^3$

$LCM = 5^2 \times 2^3 \times 3$

$= 5 \times 5 \times 2 \times 2 \times 2 \times 3$

$= 600$

By using common division method, LCM of 100, 150 and 200-

LCM -

5	100, 150, 200
5	20, 30, 40
2	4, 6, 8
2	2, 3, 4
	1, 3, 2

$LCM = 5 \times 5 \times 2 \times 2 \times 2 \times 3 = 600$

iii) 14, 21, 98

Ans- By using prime factor method, LCM of 14, 21, 98 =

Prime factors of $14 = 2 \times 7$

Prime factors of $21 = 3 \times 7$

Prime factors of $98 = 2 \times 7 \times 7$

$= 2 \times 7^2$

$LCM = 2 \times 3 \times 7^2$

$= 2 \times 3 \times 7 \times 7$

$= 294$

- By using common divison method, LCM of 14, 21 and 98 =

LCM =

7	14, 21, 98
2	2, 3, 14
	1, 3, 7

LCM = 7 x 7 x 2 x 3 = 294

iv) 22, 121 and 33

Ans- By using Prime factor method, LCM of 22, 121 and 33

Prime factors of 22 = 2 x 11

Prime factors of 121 = 11 x 11

$= 11^2$

Prime factors of 33 = 3 x 11

LCM = $11^2 \times 2 \times 3$

= 11 x 11 x 2 x 3

= 726

- By using common division method, LCM of 22, 121 and 33

LCM =

11	22, 121, 33
	2, 11, 3

LCM = 11 x 11 x 2 x 3 = 726

v) 34, 85 and 51

Ans- By using Prime factor method, LCM of 34, 85 and 51 is

Prime factors of 34 = 2 x 17

Prime factors of 85 = 5 x 17

Prime factors of 51 = 3 x 15

LCM = 2 x 5 x 3 x 17

= 510

-By using common division method, LCM of 34, 84 and 51 -

LCM =

$$17 \mid 34, 84, 51$$
$$2, 5, 3$$

LCM = $17 \times 2 \times 5 \times 3$

$= 510$

3. The HCF and the LCM of two numbers are 50 and 300 respectively. If one of the numbers is 150, find the other one.

Ans- HCF of the two numbers = 50

LCM of the two numbers = 300

Relationship between HCF and LCM is =

Product of the HCF and LCM = Product of the two numbers.

Now HCF × LCM = 50×300

$= 15,000$

So, as per the relation,

Product of two number = 15,000

One number = 150

Other number = $15000 \div 150$

$= 100$

So, the other number is 100.

4. The product of two number is 432 and their LCM is 72, Find their HCF.

Ans- Product of two number = 432

LCM = 72

Relation between HCF and LCM is

Product of two number = Product of their LCM and HCF

Product of two number = 432

So, as per the relation,

HCF × LCM = 432, HCF × 72 = 432

So, HCF = $432 \div 72 = 6$

∴ HCF is 6.

5. The product of two number 19,200 and their H.C.F 40. Find L.C.M.

Ans- Product of two numbers = 19,200

HCF = 40

Relation between HCF and LCM is

Product of two numbers = Product of their HCF and LCM

Product of two number = 19,200

So as per the relation,

HCF x LCM = 19,200

40 x LCM = 19,200

LCM = 19,200 / 40 = 480

Hence LCM = 480

6. Find the smallest number which, when divided by 12, 15, 18, 24 and 36 leaves no remainder.

Ans- Here we need to find LCM.

The given numbers LCM will be the least number which is exactly divisible by 12, 15, 18, 24 and 36 and leaves no remainder.

2	12, 15, 18, 24, 36
2	6, 15, 9, 12, 18
3	3, 15, 9, 6, 9
3	1, 5, 3, 2, 3
	1, 5, 1, 2, 1

LCM = 2 x 2 x 2 x 3 x 3 x 5 = 360

So, the smallest required number is 360.

7. Find the smallest number which, when increased by one is exactly divisible by 12, 18, 24, 32 and 40

Ans- First let us find out LCM of 12, 18, 24, 32 and 40

2	12, 18, 24, 32, 40
2	6, 9, 12, 16, 20
2	3, 9, 6, 8, 10
2	3, 9, 3, 4, 5
2	3, 9, 3, 2, 5
3	3, 9, 3, 1, 5
	1, 3, 1, 1, 5

LCM = 2 x 2 x 2 x 2 x 2 x 3 x 3 x 5 = 1440

1440 (increased by one)

Therefore the required number = 1440 - 1 = 1439

So, the smallest number which, when increased by one is exactly divisible by 12, 18, 24, 32 and 40 is 1439.

8. Find the smallest number which on being decreased by 3, is completely divisible by 18, 36, 32 and 27.

Ans- First let us solve the LCM of 18, 36, 32 and 72

2	18, 36, 32, 27
2	9, 18, 16, 27
3	9, 9, 8, 27
3	3, 3, 8, 9
2	1, 1, 8, 3
2	1, 1, 4, 3
	1, 1, 2, 3

LCM = 2 x 2 x 2 x 2 x 2 x 3 x 3 x 3 = 864

Now we need to find a number which when decreased by 3.

So the required number is 864 + 3 = 867

So, the smallest number which on being decreased by 3 is completly divisible by 18, 36, 32 and 27 is 867.