HCF and LCM

Exercise

Solution 1:

1. The greatest common factor of given numbers is called H.C.F.
2. The smallest common multiple of given numbers is called L.C.M.
3. L.C.M of two or more prime numbers is equal to their multiplication.
4. H.C.F of two or more prime numbers is equal to 1.
5. For any numbers the smallest common factor is 1.

Solution 2(1):

2	18	27
3	9	27
3	3	9
3	1	3
	1	1

L.C.M of 18 and 27 = 2 × 3 × 3 × 3 = 54

Solution 2(2):

2	30	45
3	15	45
3	5	15
5	5	5
	1	1

L.C.M of 30 and 45 = 2 × 3 × 3 × 5 = 90

Solution 2(3):

2	13	26	39
3	13	13	39
13	13	13	13
	1	1	1

L.C.M of 13, 26 and 39 = 2 × 3 × 13 = 78

Solution 2(4):

2	20	40	50
2	10	20	25
2	5	10	25
5	5	5	25
5	1	1	5
	1	1	1

L.C.M of 20, 40 and 50 = 2 × 2 × 2 × 5 × 5 = 200

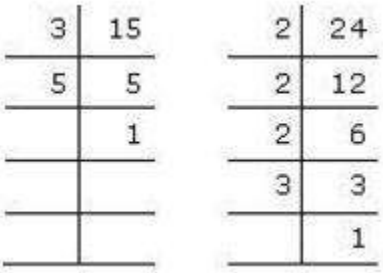
Solution 3(1):

5	5
	1

13	13
	1

Factors of 5 = 1, 5
Factors of 13 = 1, 13
∴ H.C.F of 5 and 13 is 1.

Solution 3(2):

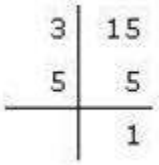


3	15
5	5
	1

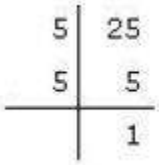
2	24
2	12
2	6
3	3
	1

Factors of 15 = 3 , 5
Factors of 24 = 2 , 2 , 2 , 3
∴ H.C.F. of 15 and 24 is 3.

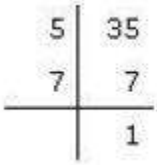
Solution 3(3):



3	15
5	5
	1



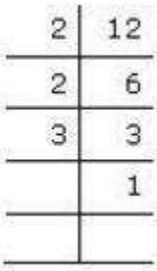
5	25
5	5
	1



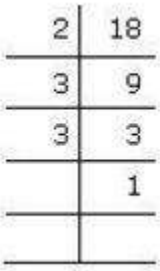
5	35
7	7
	1

15 = 3, 5
25 = 5, 5
35 = 5, 7
∴ H.C.F of 15, 25 and 35 is 5.

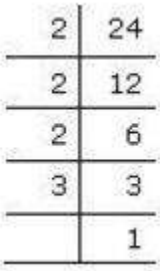
Solution 3(4):



2	12
2	6
3	3
	1



2	18
3	9
3	3
	1



2	24
2	12
2	6
3	3
	1

12 = 2, 2, 3
18 = 2, 3, 3
24 = 2, 2, 2, 3
∴ H.C.F of 12, 18 and 24 is 6.

Practice – 1

Solution 1(1):

Multiples of 6: 6, 12, 18, 26, 30, 36……
Multiples of 10: 10, 20, 30, 40, 50……
∴ Least common multiple of 6 and 10 is 30.

Solution 1(2):

Multiples of 9: 9, 18, 27, 36……
Multiples of 18:18, 36, 54, 72……..
∴ Least common multiple of 9 and 18 is 18.

Solution 1(3):

Multiples of 12: 12, 24, 36, 48, 60, 72……..
Multiples of 18: 18, 36, 54, 72, 90……..
Multiples of 24: 24, 48, 72, 96
∴ Least common multiple of 12, 18 and 24 is 72.

Solution 1(4):

Multiples of 5: 5, 10, 15, 20, 25, 30, 35, 40…….
Multiples of 10: 10, 20, 30, 40, 50……
Multiples of 15: 15, 30, 45, 60……
∴ Least common multiple of 5, 10 and 15 is 30.

Solution 2(1):

2	10	12
2	5	6
3	5	3
5	5	1
	1	1

Hence, L.C.M of 10 and 12 = 2 × 2 × 3 × 5 = 60
∴ Least common multiple of 10 and 12 is 60.

Solution 2(2):

2	24	30
2	12	15
2	6	15
3	3	15
5	1	5
	1	1

Hence, L.C.M of 24 and 30 = 2 × 2 × 2 × 3 × 5 = 120
Thus, least common multiple of 24 and 30 is 120

Solution 2(3):

3	3	9	15
3	1	3	5
5	1	1	5
	1	1	1

Hence, L.C.M of 24 and 30 = 2 × 2 × 2 × 3 × 5 = 120
Thus, least common multiple of 24 and 30 is 120

Solution 2(4):

2	11	22	33
3	11	11	33
11	11	11	11
	1	1	1

Hence, L.C.M of 11, 22 and 33 = 2 × 3 × 11 = 66
Thus, least common multiple of 11, 22 and 33 is 66.

Solution 3:

The three lights will blink at the common multiple of 2 seconds, 6 seconds and 10 seconds. L.C.M of the three durations of time.
That is the L.C.M of 2, 6 and 10

2	2	6	10
3	1	3	5
5	1	1	5
	1	1	1

The L.C.M of 2, 6 and 10 is = 2 × 3 × 5 = 30
∴The three lights will blink together after every 30 seconds.

Practice – 2

Solution 1(1):

Factors of 6: 1, 2, 3, 6
Factors of 8: 1, 2, 4, 8
The common factors of 6 and 8 are 1 and 2.
∴ H.C.F of 6 and 8 is 2.

Solution 1(2):

Factors of 16: 1, 2, 4, 8, 16
Factors of 56: 1, 2, 4, 7, 8, 14, 28, 56
The common factors of 16 and 56 are 1, 2, 4 and 8.
∴ H.C.F of 16 and 56 is 8.

Solution 1(3):

Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24
Factors of 60: 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60
Factors of 84: 1, 2, 3, 4, 6, 12, 14, 21, 28, 42, 84
The common factors of 24, 60 and 84 are 1, 2, 3, 4, 6 and 12.
∴ H.C.F of 24, 60 and 84 is 12.

Solution 1(4):

Factors of 75: 1, 3, 5, 15, 25, 75
Factors of 79: 1, 79
Factors of 89: 1, 89
The common factors of 75, 79 and 89 are 1.
∴ H.C.F of 75, 79 and 89 is 1.

Solution 2(1):

5	25
5	5
	1

5	55
11	11
	1

25 = 5 × 5
55 = 5 × 11
∴ H.C.F of 25 and 55 is 5.

Solution 2(2):

2	66
3	33
11	11
	1

2	88
2	44
2	22
11	11
	1

66 = 2 × 3 × 11
88 = 2 × 2 × 2 × 11
∴ H.C.F of 66 and 88 is 11.

Solution 2(3):

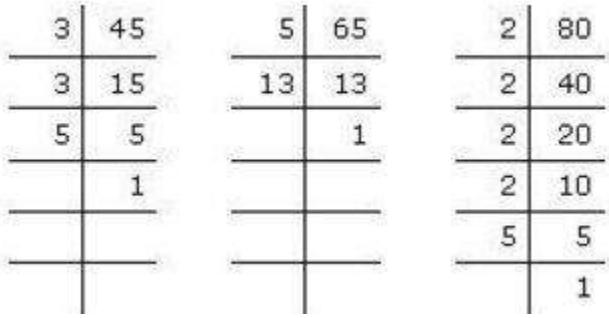
2	54
3	27
3	9
3	3
	1

3	81
3	27
3	9
3	3
	1

3	99
3	33
11	11
	1

54 = 2 × 3 × 3 × 3
81 = 3 × 3 × 3 × 3
99 = 3 × 3 × 11
∴ H.C.F of 54, 81 and 90 is 9.

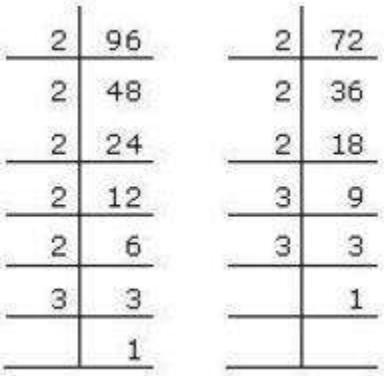
Solution 2(4):



45 = 3 × 3 × 5
65 = 5 × 13
80 = 2 × 2 × 2 × 2 × 5
∴ H.C.F of 45, 65 and 80 is 5.

Solution 3:

Given:
Number of marbles = 96
Number of chocolates = 72
Number of students =?
After distributing equal number of marbles and chocolates nothing was left, neither a chocolate nor a marble.
Together, number of students in the class must be having a factor, common to the number of marbles and number of chocolates.
Since we have to find maximum possible number of students in the class, we find the H.C.F of 96 and 72.



96 = 2 × 2 × 2 × 2 × 2 × 3
72 = 2 × 2 × 2 × 3 × 3
∴ H.C.F of 96 and 72 and 96 = 2 × 2 × 2 × 3 = 24
Hence there can be a maximum of 24 students in the class.