CHAPTER 3

PLAYING WITH NUMBERS

Co- Prime Numbers- Two numbers having only 1 as a common factor are called co-prime numbers.

Exercise- 3.4

COMMON FACTORS AND COMMON MULTIPLES

1. **Find the common factors of:**
   a. **20 and 28**

20	28
1 x 20	1 x 28
2 x 10	2 x 14
4 x 5	4 x 7

   Factors of 20 - <u>1</u> ,<u>2</u>,<u>4</u>,5,10,20
   Factors of 28- <u>1</u>, <u>2</u>,<u>4</u>,7,14,28
   Common factors are- 1, 2 and 4.

   b. **35 and 50**

35	50
1 x 35	1 x 50
7 x 5	2 x 25
	5 x 10

   Factors of 35- <u>1</u>, 7,<u>5</u>,35
   Factors of 50- <u>1</u>, 2 ,<u>5</u>,10,25,50
   Common factors are – 1 and 5.

   PRACTISE SUMS

   Find common factors of:
   a. 15 and 25
   b. 56 and 120

2. **Find the common factors of:**

a. **4 , 8 and 12**

4	**8**	**12**
1 x 4	**1 x 8**	**1 x 12**
2 x 2	**2 x 4**	**2 x 6**
		3 x 4

Factors of 4- 1, 2, 4

Factors of 8- 1, 2, 4, 8

Factors of 12- 1, 2, 3, 4, 6, 12

Common factors are – 1, 2 and 4.

b. **5, 15 and 25**

5	**15**	**25**
1 x 5	**1 x 15**	**1 x 25**
	3 x 5	**5 x 5**

Factors of 5- 1, 5

Factors of 15- 1, 3, 5, 15

Factors of 25- 1, 5, 25

Common factors are- 1 and 5.

PRACTISE SUMS

Find common factors of:

a. **12, 24 and 36**

b. **14, 63 and 84**

3. **Find first three common multiples of:**

a. **6 and 8**

Multiples of 6- 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72

Multiples of 8- 8, 16, 24, 32, 40, 48, 56, 64, 72, 80

Common multiples are- 24, 48 and 72

b. **Practise sums**

12 and 18

4. **Practise sums**

Write all the numbers less than 100 which are common multiples of 3 and 4.

5. **Which of the following numbers are co-prime?**
   a. **18 and 35**

18	**35**
1 x 18	**1 x 35**
2 x 9	**5 x 7**
3 x 6	

Factors of 18- 1, 2, 3, 6, 9, 18

Factors of 35- 1, 5, 7, 35

Common factor is- 1

Therefore 18 and 35 are co-prime.

PRACTISE SUMS

a. **15 and 37**
b. **30 and 415**
c. **17 and 68**
d. **216 and 215 (two consecutive numbers are always co-prime in nature)**
e. **81 and 16**

6. **A number is divisible by both 5 and 12. By which other number will that number be always divisible?**

SOLUTION- If a number is divisible by 5 and 12 , then that number will also be divisible by their multiple- 5 x 12 = 60

Example 120 is divisible by 5 and 12 also divisible by 60.

7. **A number is divisible by 12. By what other numbers will that number be divisible?**

   SOLUTION- Other numbers that will divide are all the factors of 12.

   12

   1 x 12

   2 x 6

3 x 4

2, 3, 4, 6 will also divide that number.

SOME MORE DIVISIBILITY RULES

i. **If a number is divisible by another number then it is divisible by each of the factors of that number.**
   Example- factor of 18 is 9 also 3 is a factor of 9 therefore we conclude that 3 is also a factor of 18**.**

ii. **If a number is divisible by two co-prime numbers then it is divisible by their product also.**
   Example- The number 80 is divisible by 4 and 5. It is also divisible by 4 x 5 = 20 , and 4 and 5 are co-primes.

iii. **If two given numbers are divisible by a number, then their sum is also divisible by that number.**
   Example- 16 and 20 are both divisible by 4. The number 16 + 20 = 36 is also divisible by 4.

iv. **If two given numbers are divisible by a number, then their difference is also divisible by that number.**
   Example- The numbers 35 and 20 are both divisible by 5. Their difference 35 – 20= 15 also divisible by 5.

EXERCISE 3.5

1. **Which of the following statements are true?**
   a. If a number is divisible by 3, it must be divisible by 9. True
   b. If a number is divisible by 9, it must be divisible by 3. True
   c. A number is divisible by 18, if it is divisible by both 3 and 6. True

d. If a number is divisible by 9 and 10 both, then it must be divisible by 90. True
e. If two numbers are co-primes, at least one of them must be prime. False
f. All numbers which are divisible by 4 must also be divisible by 8. False
g. All numbers which are divisible by 8 must also be divisible by 4. True
h. If a number exactly divides two numbers separately, it must exactly divide their sum. True
i. If a number exactly divides the sum of two numbers, it must exactly divide the two numbers separately. False

2. **Which factors are not included in the prime factorisation of a composite number?**
   Note : Writing a number as the product of its prime factors is called prime factorisation.
   Ans – 1 and number itself are not included in the prime factorisation of a composite number.
3. **Write the greatest 4- digit number and express it in terms of its prime factors.**
   Ans – The greatest 4-digit number is 9999
   Prime factors are
   9999 is divisible by 3 because 9+9+9+9=27
   Therefore 9999 = 3 x 3333
   3 x 3 x 1111
   3 x 3 x11 x 101
   Here all the factors obtained are prime numbers.
   Ans 9999 = 3 x 3 x 11 x 101
4. **Write the smallest 5- digit number and express it in the form of its prime factors.**

Ans. The smallest 5-digit number is 10000

Prime factors are-

10000 = 2 x 5000

2 x 2 x 2500

2 x 2 x 2 x 1250

2 x 2 x 2 x 625

2 x 2 x 2 x 5 x 125

2 x 2 x 2 x 5 x 25

2 x 2 x 2 x 5 x 5 x 5 x 5 ans.

5. **Find all the prime factors of 1729 and arrange them in ascending order. Now state the relation, if any; between two consecutive prime factors.**

Solution- 1729 = 7 x 247

7 x 13 x 19

7 < 13 < 19

6. **The product of three consecutive numbers is always divisible by 6. Verify this statement with the help of some example.**

Ans - Let three consecutive number be- 2 , 3, 4

2 x 3 x 4 = 24

In 24 the digit at ones place is even.

Therefore it is divisible by 2.

2 + 4 = 6 which is divisible by 3.

Therefore 24 is divisible by 6.

7. **The sum of two consecutive odd numbers is divisible by 4. Verify this statement with the help of some examples.**

Ans. Let the numbers be 3 and 5

3 + 5 = 8 , 8 is a multiple of 4, hence verified.

8. **Determine if 25110 is divisible by 45.**

Ans. The factors of 45 are 5 and 9

25110 having 0 at ones place therefore 25110 is divisible by 5.

2 + 5+1 + 1+0= 9 which is divisible by 9.

Hence this proves that **if a number is divisible by another number then it is divisible by each of the factors of that number.**

9. **18 is divisible by 2 and 3. It is also divisible by 2 x 3= 6. Similarly, a number is divisible by both 4 and 6. Can we say that number must also be divisible by 4 x 6=24? If not, give an example to justify your answer.**

   Solution :

   12 is divisible by 4 and 6, but not divisible by 4 x 6 =24.

10. **I am the smallest number, having four different prime factors. Can you find me?**

    Solution: Let us assume the prime factors of the the smallest number be-

    2 x 3 x 5 x 7 = 210 , therefore the smallest number is 210.