CHAPTER FIVE

SET

The number system:

Our number system can be divided into the following groups of sets:1. The set of integers, i.e {… -3,-2,-1,0,1,2,3,4 ...}.Integers are positive and negative whole numbers.

2. The set of whole numbers i.e {0,1,2,3,4 ……}.Whole numbers are numbers from zero upwards.
3. The set of natural or counting numbers i.e {1,2,3,4 …}.These are numbers from 1 upwards.
4. The set of odd numbers i.e. {1,3,5,7,9……..}.These are numbers which when divide by 2, always give us a remainder, but 1is an odd number.

5. The set of prime numbers i.e {2,3,5,7,11,13,17,…}.Prime numbers are numbers which have only two factors. For example 7 = 1x7, i.e has only two factors which are 1 and 7.Also 3 = 1x3, i.e has only two factors ie 1and 3.But 9 is not a prime number since it has four factors which are 3 and 3, as well as 1 and 9, i.e 9 = 1x9 and 9 = 3x3.

6. The set of composite numbers ie {4,6,8,9,10 …..}.These are numbers which have two or more factors, apart from itself and 1. For example considering the number 4, apart from 4 and 1, 4 has two other factors which are 2 and 2 or (2, 2), i.e 4 = 2x2. Also considering the number 12, apart from 1 and and 12, 12 has four other factors which are (3,4) and (2,6). The number 3 is not a composite number, since apart from 1 and itself (i.e 3), it has no other factors.

7. The set of even numbers ie {2,4,6,8,10,12….}.These are numbers which can be divided by 2 without any a remainder.
8. The set of irrational numbers ie $\{\ldots \pi, \sqrt{2}, \sqrt{3}, \sqrt{5}, \frac{1}{3}, \frac{2}{3}, \ldots\ldots\}$.This set consists of square root of numbers which does not give us a whole number, as well as fractions whose values are not specific. For example $\frac{2}{3} = 0.6666 \ldots \ldots and \frac{1}{3} =$

0.33333 ... ...Also π even though taken to be equal to $\frac{22}{7}$ or 3.14 has no fixed value.

9. The set of rational numbers i.e $\{\frac{1}{2}, \frac{1}{3}$, 0.2, 0.5,3,5,10, ...}. This comprises fractions, decimals and integers.

10. Set of real numbers i.e {…. -3,-2,-1, 0, ½, 0.5,$\sqrt{3}$, 8, ……..}.
This consists of all the various sets discussed, put together.

Factors of a given number:

These are whole numbers which can divide that given number without any remainder, with the given number being the highest factor. Examples are:

1. The factors of 6 = 1,2,3,6.
2. The factors of 8 = 1,2,4,8.
3. The factors of 30 = 1,2,3,5,6,15,30.

Multiple of a given number:

If y is our number, then the multiples of y = 1xy, 2xy, 3xy, 4xy …… = y, 2y, 3y,4y,…….

Example: The multiples of 2 = 1x2, 2x2, 3x2, 4x2 = 2,4,6,8 ……. Also the multiples of 5 = 1x5, 2x5, 3x5, 4x5 …. = 5, 10, 15, 20……

Q1. Find the set of natural numbers from 1 to 12.

Soln.

The set of natural numbers from 1 to 12 = {1,2,3,4,5,6,7,8,9,10,11,12} or {1,2,3,…….12}.

Q2.Find the set of the even natural numbers from 1 to 12

Soln.

We first find the set of natural numbers from 1 to 12 i.e.

{1,2,3,4,5,6,7,8,9,10,11,12}.

We then select the even numbers among them $\Longrightarrow${natural even numbers from 1 to 12} = {2, 4, 6, 8, 10, and 12}.

Q3. Determine the set of the multiples of 3, which are less than 15.

Soln.

The multiples of 3 less than 15 = {3, 6, 9, 12}.

Q4. Find the set of the odd multiples of 3 up to 18.

Soln.

The multiples of 3 up to 18 = {3, 6, 9, 12, 15, 18}.Selecting the odd ones among them $\Longrightarrow${Odd multiples of 3 up to 18} = {3,9,15}.

Q5. Find the set of the prime factors of 6.

Soln.

{Factors of 6} = {1, 2, 3, 6}. Selecting only the prime numbers among them $\Longrightarrow$ {Prime factor of 6} = {2, 3}.

Q6. Find the set of the even whole numbers from 10 to 15

Soln.

{whole numbers from 10 to 15}= {10, 11, 12, 13, 14, 15}.

Selecting the even numbers among them $\Longrightarrow$ {even whole numbers from 10 to 15} = {10, 12, 14}.

Q7. Find the set of the odd whole numbers from 5 to 10

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Soln.

{whole numbers from 5 to 10} = {5, 6, 7, 8 ,9, 10}.Selecting the odd ones among them $\Longrightarrow$ {odd whole numbers from 5 to 10} = {5,7,9}.

Q8. Find the set of all the composite numbers from 3 to 12.

Soln.

{Composite numbers from 3 to 12}= {4, 6, 8, 9, 10, 12}.

Q9. Find the set of the odd prime numbers from 1 to 6.

Soln.

{Prime numbers from 1 to 6}= {2, 3, 5}.

Selecting the odd numbers among them $\Longrightarrow$ {odd prime numbers from 1 to 6} = {3, 5}.

Q10. Find the set of composite odd numbers from 5 to 12.

Soln.

{Odd numbers from 5 to 12} = {5, 7, 9, 11}.

Selecting the composite ones among them $\Longrightarrow$ {composite odd number from 5 to 12} = {9}.