SERIES

A series is a sequence of numbers, where the sequence of numbers is obtained by some particular pre-defined rule and by applying that rule it is possible to find out the next term of the series.

(1) Arithmetic Series : An arithmetic series is one in which successive numbers are obtained by adding (or subtracting) a fixed number to the previous number. For example :

3, 5, 7 , 9 , 11, ...

(2) Geometric Series : A geometrical series is one in which each successive number is obtained by multiplying (or dividing) the previous number by a fixed number. For example, 4, 8, 16, 32, 64 .....

(3) Series of squares, cubes etc. These series can be formed by squaring or cubing every successive number. For example, 2, 4, 16, 256, ...

Some Important Rules for Number series :

1. The numbers in the series increases or decreases by perfect squares. For example :
   $-(2)^2$, $-(3)^2$, $-(5)^2$; 2^2, 3^2, 5^2
2. The numbers in the series increases or decreases by perfect cubes. For example :
   -1^3, -2^3, -3^3, -4^3; 1^3, 2^3, 3^3, 4^3,
3. The numbers in the series increases or decreases by prime number. For example :
   13, 11, 7, 5, 3, ...
4. The numbers in the series are multiples of a number. For example :
   $2, \times 3, \times 4, \times 5, \times 6, \times 7, \times$ ...
5. The numbers in the series is found by dividing certain numbers. For example :
   $2, \div 4, \div 5, \div 8$ .....
6. The numbers in the series are in AP. Here, some given numbers are said to be in AP if the difference between two consecutive numbers is same. For example :
   1, 3, 5, 7, 9, 11, ...
7. The numbers in the series are in GP. Here, some given numbers are said to be in GP if the difference between two consecutive numbers follow a certain pattern of multiplication or division or same as the lowest number throughout the series. For example : 32, 16, 8, 4, 2.
8. Some special rules are for special series. This can be found out by observing the series of numbers.
9. In the special series, two series may be mixed.

EXERCISE

Directions (Qs. 1 to 7) : *In the following number series, one of the numbers does not fit into the series. Find the wrong number.*

1. 2, 5, 10, 18, 26, 37, 50
(*a*) 2 (*b*) 5
(*c*) 37 (*d*) 18
(*e*) None of these

2. 3 , 18, 38, 78, 123, 178, 243
(*a*) 123 (*b*) 178
(*c*) 3 (*d*) 38
(*e*) None of these

3. 380, 188, 92, 48, 20, 8, 2
(*a*) 188 (*b*) 92
(*c*) 48 (*d*) 20
(*e*) None of these

4. 5, 11, 23, 47, 96, 191, 383
(*a*) 11 (*b*) 23
(*c*) 47 (*d*) 96
(*e*) None of these

5. 89, 78, 86, 80, 85, 82, 83
(*a*) 78 (*b*) 86
(*c*) 80 (*d*) 85
(*e*) None of these

6. 58, 57, 54, 50, 42, 33, 32
(*a*) 57 (*b*) 54
(*c*) 50 (*d*) 32
(*e*) None of these

7. 2, 20, 27, 44, 64
(*a*) 27
(*b*) 8
(*c*) 20
(*d*) 44
(*e*) None of these

Directions (Qs. 8 to 10) : *Complete the following series.*

8. 1 4 9 16 25 36 49 ....
(*a*) 54 (*b*) 56
(*c*) 64 (*d*) 81
(*e*) None of these

9. 11 13 17 19 23 29 31 37 41 ....
(*a*) 43 (*b*) 47
(*c*) 53 (*d*) 51
(*e*) None of these

10. 3 7 6 5 9 3 12 1 15 ....
(*a*) 18 (*b*) 13
(*c*) –1 (*d*) 3
(*e*) None of these

EXPLANATORY ANSWERS

1. (*d*) : 2 5 10 18 26 37 50
↓ ↓ ↓ ↓ ↓ ↓ ↓
1^2+1 2^2+1 3^2+1 4^2+1 5^2+1 6^2+1 7^2+1
Wrong no. = 18, Correct no. = 17.

2. (*c*) : Only 3 is a prime number.

3. (*c*) : Wrong no. = 48, Correct no. = 44
Each term will be four more than two times the next term.

4. (*d*) : 5 11 23 47 [96] 191 383
+6 +12 +24 +48 +96 +192
Wrong no. = 96, Correct no. = 95.

5. (*a*) : If 87 is written in place of 78 then tens digit of each term will be 8.

6. (*c*) : 58 57 54 [50] 42 33 22
–1 –3 –5 –7 –9 –11
Wrong no. = 50, Correct no. = 49.

7. (*c*) : 2 [20] 27 44 64
+11 +14 +17 +20
Wrong no. = 20, Correct no. = 13.

8. (*c*) : Numbers are 1^2, 2^2, 3^2, 4^2, 5^2, 6^2, 7^2.
So, the next number is $8^2 = 64$.

9. (*a*) : Numbers are all primes. The next prime is 43.

10. (*c*) : There are two series, beginning respectively with 3 and 7. In one 3 is added and in another 2 is subtracted.
The next number is $1 - 2 = -1$.