SERIES

Questions on number series are prevalent in most of the exams. Almost 4-5 Questions comes in exam from this topic. These questions are based on numerical sequences that follow a logical rule/ pattern based on elementary arithmetic concepts. A particular series is given from which the pattern must be analyzed. You are then asked to predict the next number in the sequence following the same rule.

Number series is a arrangement of numbers in a certain order, where some numbers are wrongly put into the series of numbers and some number is missing in that series, we need to observe and find the accurate number to the series of numbers.

Tips For Number Series

1) Try to observe if there are any familiar numbers in the given series.
2) Familiar numbers are the numbers which which are easy to identify like primes numbers, perfect squares, cubes.
3) If you are unable to find familiar number, Calculate the differences between the numbers and observe the pattern in the differences.

4) If the differences are growing slowly it might be an addition or subtraction series or If the differences are growing rapidly it might be a square series, cube series, or multiplicative series.

5) If the differences also are not having any pattern then observe every alternate number (ie every 3rd number form a series) for any pattern.

6) The possible cases may be like sum or the average of two consecutive numbers gives 3rd number.
7)If still you do not find any pattern, it signifies that the series follows a complex pattern. Check for cases like multiplying the number and adding/ subtracting a constant number from it to reach the pattern.

Below are the common pattern of questions usually asked in numbers series:

I. Fibonnaci Series

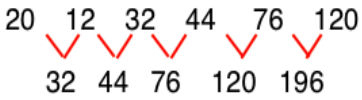
The Fibonnaci sequence is a series of numbers where a no. is found by adding up the nos. before it. Let us understand the series with the help of an example:

Example 1:

0,1,1,2,3,5,8,13,21,___.

Example 2:

20, 12, 32, 44, 76, 120,____.



II. Addition series

There can be 2 types of pattern in addition series.

(A) Same number Addition series

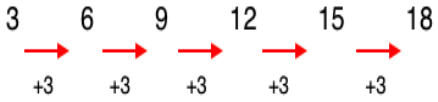
In this type of series, the difference between 2 consecutive elements is same i.e. same digit is to be added to the previous element to obtain the next element.

Example 3:

3, 6, 9, 15, 18,___.

Sol. In the given series, the difference between the two consecutive elements is same i.e 3.

In this type of series, the number added to each term is in increasing order.



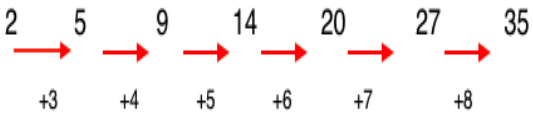
(B) Increasing order Addition series

In the given series, the difference between 2 consecutive numbers is in increasing order.

Example 4:

2, 5, 9, 14, 20, 27,____.

Sol. In the given series, the difference between 2 consecutive numbers is in increasing order i.e 3,4,5,6,7 and 8 respectively.



III. Subtraction series

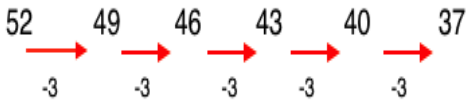
(A) Same Number Subtraction Series

In this type of series, each time the same number is subtracted from the previous element to obtain the next element.

Example 5:

52, 49, 46, 43, 40,____.

Sol. Here the difference between 2 consecutive nos. is 3.

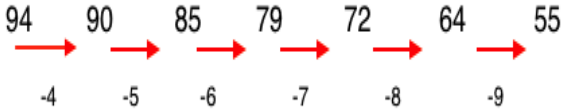


(B) Increasing order Subtraction Series

Example 6:

94, 90, 85, 79, 72, 64,___.

Sol. Here the difference between 2 consecutive elements is in increasing order.



IV. Multiplication Series

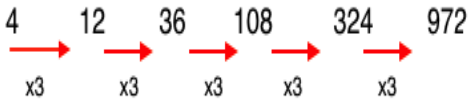
(A) Same number multiplication Series

In this series, the ratio between 2 consecutive elements is same.

Example 7:

4, 12, 36, 108, 324,____.

In the given series, previous element is multiplied by 3 to obtain the next element and therefore the ratio between 2 consecutive elements is same.



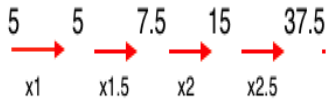
(B) Increasing order of Multiplication Series

In this type of series, elements are multiplied in increasing order to find the next element.

Example 8:

5, 5, 7.5, 15,___.

In the given series, the ratio between 2 consecutive elements is in increasing order and elements are multiplied by the numbers in increasing order.



V. Division series

(A) Same number division series

In this type, each time the previous element is divided by same digit to obtain the next element.

Example 9:

1600, 400, 100, 25,___.

Sol. In the given series, previous element is divided by 4 to get the next element.

1600/4 = 400

400/4 = 100

100/4 = 25

25 /4 = 6.25

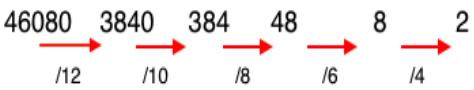
Therefore, the correct answer = 6.25

(B) Increasing/Decreasing order division series

Example 10:

46080, 3840, 384, 48, 8, 2,____.

Sol. In the given series, elements are divided by 12, 10, 8, 6 and 4 respectively to obtain the next elements.

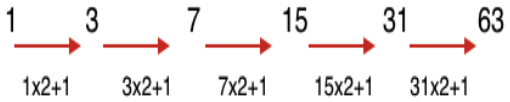


VI. Addition & Multiplication together

Example 11:

1, 3, 7, 15, 31,____.

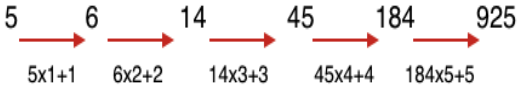
Sol. In such a series , addition and multiplication is used together.



Example 12:

5, 6, 14, 45, 184,____.

Sol. In this series, the previous elements are multiplied respectively by numbers in increasing order & numbers in increasing order respectively added in such multiplication to obtain the next element.

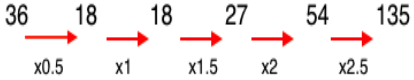


VII. Decimal Fraction

Example 13:

36, 18, 18, 27, 54,___.

Sol. In this series, following pattern is used:



VIII. Difference of difference series

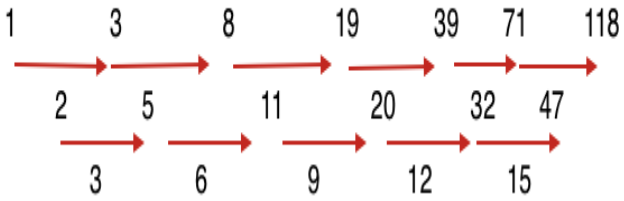
Calculate the differences between the numbers given in the series provided in the question. Then try to observe the pattern in the new set of

numbers that you have obtained after taking out the difference.

Example 14:

1, 3, 8, 19, 39, 71,_____.

Sol. The following pattern is observed in the given series



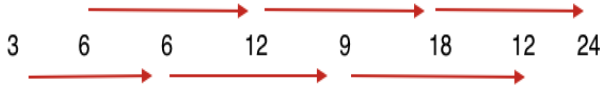
IX. Twin series

In this type of series, odd place element males one series while the even place elements make another series.

Example 15:

3, 6, 6, 12, 9, 18,_____.

Sol. In this series, following pattern is used:

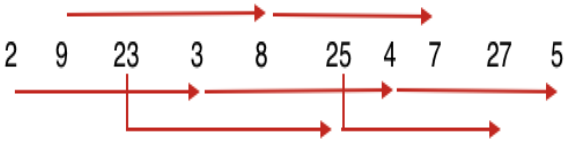


X. Tri-series

Example 16:

2, 9, 23, 3, 8, 25, 4,_____.

Sol. Following pattern is used in the given series



XI. Square series & Cube series

Example 17:

4, 9, 16, 25, 36, 49,____.

Sol. In the given series, the following pattern is used

$2^2, 3^2, 4^2, 5^2, 6^2, 7^2, 8^2$

Example 18:

Sol. In the given series, the following pattern is used

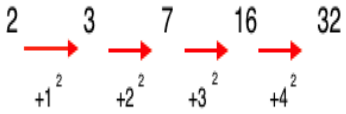
$1^3, 2^3, 3^3, 4^3, 5^3, 6^3$

XII. Square & Cube addition

Example 19:

2, 3, 7, 16,_____.

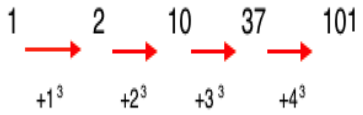
Sol. In the given series, the following pattern is used



Example 20:

1, 2, 10, 37,____.

Sol. In the given series, the following pattern is used



XIII. Digital Operation of Numbers

In this type of series, the digits of each number are operated in a certain way to obtain the next element of the series.

Example 21:

94, 36, 18,_____.

Sol. In the given series, the following pattern is used

9 *4 = 36

3 * 6 = 18

1 * 8 = 8

Correct answer - 8

- Prime Series : IN which the terms are the prime numbers in Order
  - **Ex : 2, 3, 5, 7, 11, 13, _ , 19**
    - Here the terms of the series are the prime numbers in order. The prime number after 13 is 17. So the answer to this question is 17.
- **Alternate Primes :**
  - **Ex: 2, 5, 11, 17, 23, _, 41**
    - Here the series is framed by taking the alternative prime numbers. After 23, the prime numbers are 29 and 31. So the answer is 31.
- Every Third number can be the sum of the preceding two numbers:
  - **Ex : 3, 5, 8, 13, 21**
    - Here starting from third number
      - 3 + 5 = 8
      - 5 + 8 = 13
      - 8 + 13 = 21
        - So, the answer is 13+ 21 = 34
- Every Third number can be the product of the preceeding two numbers
  - **Ex : 1, 2, 2, 4, 8, 32. _**
    - Here starting from the third number
      - 1 X 2 = 2
      - 2 X 2 = 4
      - 2 X 4 = 8
      - 4 X 8 = 32
        - *So, the answer is 8 X 32 = 256*
- The difference of any term from its succeding term is constant (either increasing series or decreasing series :
  - **Ex : 4, 7, 10, 13, 16, 19, _, 25**
    - Here the difference of any term from its succeding term is 3.
      - 7 - 4 = 3
      - 10 - 7 = 3
        - So, the answer is 19+ 3 = 22
- The difference between two consecutive terms will be either increasing or decreasing by a constant number :
  - **Ex : 2, 10, 26, 50, 82, _**
    - Here, The difference between two consecutive terms are
      - 10 - 2 = 8
      - 26 - 10 = 16
      - 50 - 26 = 24
      - 82 - 50 = 32
        - Here, the difference is increased by 8 (or you can say the multiples of 8). So the next difference will be 40 (32 + 8). So, the answer is 82+ 40 = 122
  - **Ex : 63, 48, 35, 24, 15, _**
    - Here, the difference between the two terms are
      - 63 - 48 = 15
      - 48 - 35 = 13
      - 35 - 24 = 11
      - 24 - 15 = 9
        - Here, the difference is decreased by 2. So, the next difference will be 7.

So, the answer is 15 - 7 = 8.

- The difference between two numbers can be multiplied by a constant number :
  - Ex : 15, 16, 19, 28, 55, _
    - Here, the differences between two numbers are
      - 16 - 15 = 1
      - 19 - 16 = 3
      - 28 - 19 = 9
      - 55 - 28 = 27
        - Here, the difference is multiplied by 3. So, the next difference will be

          81. So, the answer is 55 + 81 = 136
- The difference can be multiplied by numbers which will be increasing by a constant number :
  - Ex : 2, 3, 5, 11, 35, _
    - The difference between two numbers are
      - 3 - 2 = 1
      - 5 - 3 = 2
      - 11 - 5 = 6
      - 35 - 11 = 24
        - Here, the differences are multiplied by numbers which are in increasing order.
        - Differences are
          - 1
          - 1 x 2 = 2
          - 2 x 3 = 6
          - 6 x 4 = 24
          - So, the next difference will be 24 x 5 = 120. So, the answer is 35 + 120 = 155.
- Every succeeding term is got by multiplying the previous term by a constant number or numbers which follow a special pattern.
  - Ex : 5, 15, 45, 135, _
    - Here, 5 x 3 = 15
    - 15 x 3 = 45
    - 45 x 3 = 135
      - So, the answer is 135 x 3 = 405.
  - Ex : 2, 10, 40, 120, 240, _
    - Here, 2 x 5 = 10
      - 10 x 4 = 40
      - 40 x 3 = 120
      - 120 x 2 = 240
        - So, the answer is 240 x 1 = 240
- In certain series the terms are formed by various rule (miscellaneous rules). By keen observation you have to find out the rule and the appropriate answer.
  - Ex : 4, 11, 31, 90, _
    - Terms are,
      - 4 x 3 - 1 = 11
      - 11 x 3 - 2 = 31
      - 31 x 3 - 3 = 90
        - So, the answer will be 90 x 3 - 4 = 266
  - Ex : 3, 5, 14, 55, _
    - Terms are,
      - 3 x 2 - 1 = 5
      - 5 x 3 - 1 = 14
      - 14 x 4 - 1 = 55
        - So, the answer will be 55 x 5 - 1 = 274
  - Ex : 3, 7, 23, 95, _
    - Terms are,
      - 3 x 2 + 1 = 7
      - 7 x 3 + 2 = 23
      - 23 x 4 + 3 = 95
        - So, the answer will be 95 x 5 + 4 = 479
  - Ex : 6, 17, 38, 79, _
    - Terms are,
      - 6 x 2 + 5 = 17
      - 17 x 2 + 4 = 38
      - 38 x 2 + 3 = 79
        - So, the answer is 79 x 2 + 2 = 160