

CHAPTER 3

Series

NUMBER SERIES

Prime Number Series

Example 1. 4, 9, 25, 49, 121, 169,...

(a) 324

(b) 289

(c) 225

(d) 196

Solution. (b) The given series is a consecutive square of prime number series. The next prime number is 289.

Example 2. 5, 7, 13, 23, ...

(a) 25

(b) 27

(c) 29

(d) 41

Solution. (d) The difference between prime numbers is increasing. 7 is next prime to 5; 13 is second to next prime to 7; 23 is third to next to 13. Hence, next should be fourth to next prime to 23. Hence, required number is 41.

Multiplication Series

Example 3. 4, 8, 16, 32, 64... 256

(a) 96

(b) 98

(c) 86

(d) 106

Solution. (a) The numbers are multiplied by 2 to get the next number.

$$64 \times 2 = 128$$

Example 4. 5, 20, 80, 320, ... 1280

(a) 5120

(b) 5220

(c) 4860

(d) 3642

Solution. (a) The numbers are multiplied by 4 to get the next number.

$$1280 \times 4 = 5120$$

Difference Series

Example 5. 3, 6, 9, 12, 15, 21

(a) 16

(b) 17

(c) 20

(d) 18

Solution. (d) The difference between the numbers is 3.

$$15 + 3 = 18$$

Example 6. 55, 50, 45, 40,....30

- (a) 33 (b) 34
(c) 35 (d) 36

Solution. (c) The difference between the numbers is -5.

$$40 - 5 = 35$$

Division Series

Example 7. 5040, 720, 120, 24,2,1

- (a) 8 (b) 7
(c) 6 (d) 5

Solution. (c) $\frac{5040}{7} = 720, \frac{720}{6} = 120, \frac{120}{5} = 24, \frac{24}{4} = 6, \frac{6}{3} = 2, \frac{2}{2} = 1$

Example 8. 16, 24, 36,... 81

- (a) 52 (b) 54
(c) 56 (d) 58

Solution. (b) Previous number $\times \frac{3}{2}$ = Next number

n^2 Series

Example 9. 4, 16, 36, 64, 144

- (a) 112 (b) 78
(c) 100 (d) 81

Solution. (c) The series is square of consecutive even numbers. $2^2, 4^2, 6^2, 8^2$

Next number is $10^2 = 100$

Example 10. 1, 4, 9, 16, 25, 36, 49, ... 81

- (a) 100 (b) 121
(c) 64 (d) 144

Solution. (c) The series is $1^2, 2^2, 3^2, 4^2, 5^2, 6^2, 7^2, \dots$

The next number is $8^2 = 64$

$$16 \times \frac{3}{2} = 24, 24 \times \frac{3}{2} = 36 \times \frac{3}{2} = 54, 54 \times \frac{3}{2} = 81$$

$(n^2 + 1)$ Series

Example 11. 17, 26, 37, 50, 65,....101

- (a) 82 (b) 75
(c) 78 (d) 90

Solution. (a) The series is $4^2 + 1, 5^2 + 1, 6^2 + 1, 7^2 + 1, 8^2 + 1$.

The next number is $9^2 + 1 = 82$

Example 12. 101, 401, 901, 1601, 2501, 4901

- (a) 2201 (b) 3301
(c) 4401 (d) 3601

Solution. (d) The series is $10^2 + 1, 20^2 + 1, 30^2 + 1, 40^2 + 1, 50^2 + 1$, etc.

The next number is $60^2 + 1 = 3601$

$(n^2 - 1)$ Series

Example 13. 3, 8, 15, 24,...48

- (a) 32 (b) 33
(c) 34 (d) 35

Solution. (d) The series is $2^2 - 1$, $3^2 - 1$, $4^2 - 1$, $5^2 - 1$, etc.

The next number is $6^2 - 1 = 35$

Example 14. 99, 80, 63,...35

- (a) 48 (b) 84
(c) 46 (d) 64

Solution. (a) The series is $10^2 - 1$, $9^2 - 1$, $8^2 - 1$, etc.

The next number is $7^2 - 1 = 48$

$(n^2 + n)$ Series

Example 15. 2, 6, 12, 20, 30,... 56

- (a) 32 (b) 34
(c) 42 (d) 24

Solution. (c) The series is $1^2 + 1$, $2^2 + 2$, $3^2 + 3$, $4^2 + 4$, $5^2 + 5$, etc.

The next number is $6^2 + 6 = 42$

Example 16. 110, 132, 156, 182,...

- (a) 212 (b) 201
(c) 211 (d) 210

Solution. (d) The series is $10^2 + 10$, $11^2 + 11$, $12^2 + 12$, etc.

The next number is $14^2 + 14 = 210$

$(n^2 - n)$ Series

Example 17. 0, 2, 6, 12, 20,...42

- (a) 25 (b) 30
(c) 32 (d) 40

Solution. (b) The series is $1^2 - 1 = 0$, $2^2 - 2 = 2$, $3^2 - 3 = 6$, etc.

The next number is $6^2 - 6 = 30$

Example 18. 90, 380, 870, 1560,.....

- (a) 2405 (b) 2450
(a) 2400 (d) 2455

Solution. (b) The series is $10^2 - 10$, $20^2 - 20$, $30^2 - 30$, etc.

The next number is $50^2 - 50 = 2450$

n^3 Series

Example 19. 1, 8, 27, 64,... 216

- (a) 125 (b) 512
(c) 215 (d) 122

Solution. (a) The series is 1^3 , 2^3 , 3^3 , 4^3 , etc.

The next number is $5^3 = 125$

Example 20. 1000, 8000, 27000, 64000,....

- | | |
|------------|------------|
| (a) 21600 | (b) 125000 |
| (c) 152000 | (d) 261000 |

Solution. (b) The series is 10^3 , 20^3 , 30^3 , 40^3 , etc.

The next number is $50^3 = 125000$

$(n^3 + 1)$ Series

Example 21. 2, 9, 28, 65,...217

- | | |
|---------|---------|
| (a) 123 | (b) 124 |
| (c) 125 | (d) 126 |

Solution. (d) The series is $1^3 + 1$, $2^3 + 1$, $3^3 + 1$, etc.

The next number is $5^3 + 1 = 126$

Example 22. 1001, 8001, 27001, 64001, 125001,....

- | | |
|------------|------------|
| (a) 261001 | (b) 216001 |
| (c) 200116 | (d) 210016 |

Solution. (b) The series is $10^3 + 1$, $20^3 + 1$, $30^3 + 1$, etc.

The next number is $60^3 + 1 = 216001$

$(n^3 - 1)$ Series

Example 23. 0, 7, 26, 63, 124,...

- | | |
|---------|---------|
| (a) 251 | (b) 125 |
| (c) 215 | (d) 512 |

Solution. (c) The series is $1^3 - 1$, $2^3 - 1$, $3^3 - 1$, etc.

The next number is $6^3 - 1 = 215$

Example 24. 999, 7999, 26999, 63999,....

- | | |
|------------|------------|
| (a) 199924 | (b) 124999 |
| (c) 129994 | (d) 999124 |

Solution. (b) The series is $10^3 - 1$, $20^3 - 1$, $30^3 - 1$, etc.

The next number is $50^3 - 1 = 124999$

$(n^3 + n)$ Series

Example 25. 2, 10, 30, 68,....222

- | | |
|---------|---------|
| (a) 130 | (b) 120 |
| (c) 110 | (d) 100 |

Solution. (a) The series is $1^3 + 1$, $2^3 + 2$, $3^3 + 3$, etc.

The next number is $5^3 + 5 = 130$

Example 26. 1010, 8020, 27030, 64040,....

- | | |
|------------|------------|
| (a) 125500 | (b) 125050 |
| (c) 100255 | (d) 120055 |

Solution. (b) The series is $10^3 + 10 = 1010$, $20^3 + 20 = 8020$, etc.

The next number is $50^3 + 50 = 125050$

$(n^3 - n)$ Series

Example 27. 0, 6, 24, 60,.... 210

(a) 012

(b) 210

(c) 201

(d) 120

Solution. (d) The series is $1^3 - 1 = 0$, $2^3 - 2 = 6$, $3^3 - 3 = 24$, etc.

The next number is $5^3 - 5 = 120$

Example 28. 990, 7980, 26970, 63960,....

(a) 124500

(b) 124005

(c) 120045

(d) 124950

Solution. (d) The series is $10^3 - 10$, $20^3 - 20$, $30^3 - 30$ etc.

The next number is $50^3 - 50 = 124950$

LETTER SERIES

Type 1

One Letter Series Such series consists of one letter in each term and this series is based on increasing or decreasing positions of corresponding letters according to English alphabet.

Example 1: B, C, A, D, Z, E, ... F, X, G

(a) U

(b) Y

(c) W

(d) V

Solution. (b) The sequence consists of two series B, A, Z, Y, X and C, D, E, F, G. The missing letter is Y.

Example 2: P, U, Z, ... J, O, T

(a) E

(b) U

(c) S

(d) P

Solution. (a) The sequence is $P + 5$, $U + 5$, $Z + 5$. The missing letter is $Z + 5 = E$

Example 3: B, D, G, I, ... N, Q, S

(a) I

(b) J

(c) L

(d) K

Solution. (c) The sequence is $B + 2$, $D + 3$, $G + 2$, $I + 3$ and so on.

Type 2

Two Letter Series The first letters of the series follow one logic and the second letters follow another logic.

Example 4: EZ, DX, CV, ..., AR, ZP

(a) CS

(b) AM

(c) BT

(d) TG

Solution. (c) First and second letters follow a sequence of -1 and -2 respectively.

Example 5: DG, HK, LO, PS, TW, ...

(a) XA

(b) ZA

(c) XB

(d) None of these

Solution. (a) First and second letters follow a sequence of + 4.

Example 6: DX, EY FV, ... : ; HT, IU

(a) HV

(b) IX

(c) GW

(d) BZ

Solution. (c) First, -third and fifth terms follow a sequence and second, fourth and sixth terms follow another sequence. (DX, FV, HT, etc) and (EY, GW, IU, etc).

Type 3

Three Letter Series: Such series consist of three letters in each term. The first letters follow one logic, the second letters follow another logic and the third letters follow some other logic.

Example 7: DIE, XCY, RWS, ...

(a) LQN

(b) QMP

(c) LMS

(d) LQM

Solution. (d) First, second and third letters of each group follow a sequence of -6 series.

Example 8: VPG, UQF, ..., SSD, RTC

(a) SQD

(b) TRE

(c) TRS

(d) QDT

Solution. (b) First, second and third letters follow a sequence of -1, +1, -1 series respectively.

Example 9: DJS, HNW, LRA, PVE, ..., XDM

(a) TZI

(b) SAF

(c) UXH

(d) None of these

Solution. (a) First, second and third letters follow a sequence of +4 series.

Type 4

A series of letters is given with one or more missing letters. From the choices, the choice that gives the letters that go into the blanks has to be selected as answer.

Example 10: In the following series some letters are missing. From the choices, select the choice that gives that letters that can fill the blanks in the given sequence.

a _ c _ b _ ab _ a _ ca _ c

(a) abaccb

(b) accbab

(c) aabbcc

(d) bacccb

Solution. (d) First of all, notice that there are 6 blanks in the given sequence and each choice gives six letters to fill the six blank in order. Now, we have to select an alternative which if placed in the blanks of the series in order, we get a complete series of letters which follow some particular pattern.

The best way is to try with each option. Inserting the letters of option (d) in place of the blanks, we get a series like "abc abc abc abc abc" which is a repetition of the group of letters "abc".

Type 5

Here, students are asked to count how many times a particular letter or group of letters satisfying some conditions occurs and mark that number as the answer choice.

Example 11: In the following sequence of letters, in how many instances the letters n is immediately preceded by the letter t?

snruatnngjhjtknstndgclntttnnntntntsmvbtngcxdptnklstnt

(a) 5

(b) 6

(c) 7

(d) 8

Solution. (d) On counting, we find that the letter n occurs 8 times, where n is immediately preceded by the letter t