

# Reasoning Ability

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# SERIES COMPLETION

In verbal series, words, letters or digits are given in a specific sequence/order and we have to find out next word, letter or digit to complete the given series.

## TYPES OF SERIES COMPLETION

### TYPE 1 : ALPHABET SERIES

In series, given alphabets follows a particular pattern or sequence or order. We have to detect the pattern from the given alphabets and find missing alphabet or the next alphabet to continue the pattern.

- There are no set rules.
- There can be omission of alphabets in an order.
- Alphabets may also be omitted in an increasing/decreasing order, which may be direct increase or decrease.
- In solving these questions pattern of the alphabet series should be noted.

### POSITION OF ALPHABETS

Position from Left to Right	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Position from Right to left	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

### SOME SKIPPING PATTERNS

(i) **Regular Order** : Number of alphabets skipped remains the same.

Ex. A, D, G, J,..... ?

Ans. M

as 2 alphabets are skipped each time.

A B C D E F G H I J K L M

(ii) **Increasing order**

Each time the number of alphabets skipped increases in a given pattern.

Ex. A, C, F, J, O ?

Ans. U (A B C D E F G H I J K L M N O P Q R S T U)

each time number of letter skipped increases by 1.

(iii) **Decreasing order**

Each time the number of letters skipped decreases in a given pattern.

Ex. A G L P S ?

Ans. U

Here, number of letters skipped decreases by one each time *i.e.* first 5, then 4, then 3, and so on.

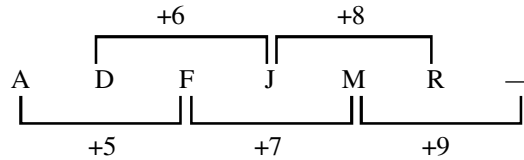
(iv) **Interlinked Series**

In this two or more series are attached together. These different series follows their own rules.

Ex. A D F J M R ?

Ans. V

Here there are two interlinked series.



**SOLVED EXAMPLES**

1. Which term comes next in the sequence AC, FH, KM, PR ?

- (a) UW                      (b) VW                      (c) UX                      (d) TV  
(e) None of these

**Sol.** Clearly, the first and second letters of each term are moved five steps forward to obtain the corresponding letter of the next term. Thus, the first letter of the missing term must be five steps ahead of P *i.e.* U, while the second letter must be five letter ahead of R *i.e.* W.

So, missing term is UW, ∴, answer is (a).

2. Find next term in the series

**BMO, EOQ, HQS, ?**

- (a) KSU                      (b) LMN                      (c) SOV                      (d) SOW

**Sol.** Clearly, we observe the following pattern :

The first letter follows the pattern +3 *i.e.*

$$B \xrightarrow{+3} E \xrightarrow{+3} H \xrightarrow{+3} (K)$$

The second letter follows the pattern +2 *i.e.*

$$M \xrightarrow{+2} O \xrightarrow{+2} Q \xrightarrow{+2} (S)$$

The third letter follows the pattern +2 *i.e.*

$$O \xrightarrow{+2} Q \xrightarrow{+2} S \xrightarrow{+2} (U)$$

Thus the missing term is KSU, Hence the answer is (a).

3. Which term comes next in the series YEB, WFD, UHG, SKI, ?

- (a) QOL                      (b) QGL                      (c) TOL                      (d) QNL

**Sol.** We observe the following patterns.

$$\text{1st letter : } Y \xrightarrow{-2} W \xrightarrow{-2} U \xrightarrow{-2} S \xrightarrow{-2} (Q)$$

$$\text{2nd letter : } E \xrightarrow{+1} F \xrightarrow{+2} H \xrightarrow{+3} K \xrightarrow{+4} (O)$$

$$\text{3rd letter : } B \xrightarrow{+2} D \xrightarrow{+3} G \xrightarrow{+2} I \xrightarrow{+3} (L)$$

Thus, the missing term is QOL, Hence the answer is (a).

**PRACTICE TEST-I**

1. R, U, X, A, D, ?  
(a) F (b) G (c) H (d) I
2. ab, ba, abc, cba, abcd,.....  
(a) acbd (b) bacd (c) cabd (d) dcba
3. ...., SIY, OEU, KAQ, GWM, CSI  
(a) VMC (b) WMC (c) VNC (d) WNC
4. YXZ, XWY,....., VUW, UTV, TSU  
(a) VWT (b) WXV (c) TVX (d) WVX
5. PTVX, AEGI, ....., WACE, HLNP  
(a) KNQT (b) LPRT (c) KPQS (d) HKLO
6. Z, Y, X, U, T, S, P, O, N, K, ?, ?  
(a) H, G (b) H, I (c) I, H (d) JI
7. GH, JL, NQ, SW, YD, ?  
(a) EJ (b) FJ (c) EL (d) FL
8. ajs, gpy, ?, sbk, yhq  
(a) dmv (b) mve (c) oua (d) qz
9. PMT, OOS, NQR, MSQ, ?  
(a) LUP (b) LVP (c) LVR (d) LWP
10. BZA, DYC, FXE, ?, JVI  
(a) HUG (b) HWG (c) UHG (d) WHG  
(e) None of these
11. ABD, DGK, HMS, MTB, SBL, ?  
(a) XKW (b) ZAB (c) ZKU (d) ZKW
12. WFB, TGD, QHG, ?  
(a) NIJ (b) NIK (c) NJK (d) OIK (e) PJK
13. UPI, ?, ODP, MBQ, IAW  
(a) RHJ (b) SHJ (c) SIJ (d) THK (e) TIJ
14. ATTRIBUTION, TTRIBUTIO, RIBUTIO, IBUTI, ?  
(a) IBU (b) UT (c) UTI (d) BUT  
(e) None of these
15. ADVENTURE, DVENTURE, DVENTUR, ?, VENTU  
(a) DVENT (b) VENTURE (c) VENTUR (d) DVENTU  
(e) None of these

**ANSWERS**

1. (b) 2. (d) 3. (b) 4. (d) 5. (b) 6. (d) 7. (d) 8. (b) 9. (a) 10. (b)  
11. (d) 12. (b) 13. (b) 14. (c) 15. (c)

**TYPE 2 : NUMBER SERIES**

In number series, some numbers are arranged in a particular order. All the numbers form a series and change in certain order. Sometimes, one or more numbers are wrongly put in the number series. We are required to observe the trend in which number change in the series and find out which number/numbers misfit into the series.

**SOLVED EXAMPLES****Ex.1. 4, 8, 28, 80, 244, ?**

- (a) 278                      (b) 428                      (c) 628                      (d) 728

**Sol.** The terms of given series are  $3^1 + 1, 3^2 - 1, 3^3 + 1, 3^4 - 1, 3^5 + 1, 3^6 - 1$ So, missing term =  $3^6 - 1 = 729 - 1 = 728$ 

Hence, the answer is (d)

**Ex.2. 0, 6, 24, 60, 120, 210, ?**

- (a) 240                      (b) 290                      (c) 336                      (d) 504

**Sol.** The given series is :  $1^3 - 1, 2^3 - 2, 3^3 - 3, 4^3 - 4, 5^3 - 5, 6^3 - 6$  $\therefore$  missing term =  $7^3 - 7 = 343 - 7 = 336$ 

Hence, the answer is (c)

**Ex.3. 1, 3, 3, 6, 7, 9, ?, 12, 21**

- (a) 10                      (b) 11                      (c) 12                      (d) 13

**Sol.** The given sequence is a combination of two series.

I. 1, 3, 7, ?, 21 and II. 3, 6, 9, 12

The pattern followed in I is +2, +4,..... and pattern followed in II is +3 so, missing number =  $7 + 6 = 13$ 

Hence, the answer is (d)

**Type 2 : (a) Triangular Pattern Series**

Sometimes, the difference between the consecutive terms of a series, again form a series. The difference between the consecutive terms of the new series so formed, again form a series. This pattern continues till we attain a uniform difference between the consecutive terms of the series.

**Ex.5. Find the missing term in the series 3, 20, 63, 144, 275, ?****Sol.** Series I :     3        20        63        144        275 ?

Series II :        17        43        81        131 ?

Series III :        26        38        50 ?

Series IV :        12        12 ?

Now pattern in series III is +12.

So, missing term in series III is  $50 + 12 = 62$  ;Missing term in series II is  $131 + 62 = 193$  ;Missing term in series I is  $275 + 193 = 468$  ;

Thus, the missing term is 468.

**Direct Method**Missing term is =  $275 + (131 + 50 + 12) = 468$

**2. (b) Elementary Idea of Progression**

**I. Arithmetic Progression (A.P.) :** The progression of the form  $a, a + d, a + 2d, a + 3d, \dots$  is known as an A.P. with term =  $a$  and common difference =  $d$

**Ex. 3, 6, 9, 12, .....** is an A.P. with  
 $a = 3$  and  $d = 6 - 3 = 3$ .

In an A.P., we have  $n$ th term =  $a + (n-1)d$ .

**II. Geometric Progression (G.P.) :** The progression of the form  $a, ar, ar^2, ar^3, \dots$  is known as G.P. with first term as  $a$  and common ratio =  $r$

**Ex. 1, 5, 25, 125, .....** is a G.P. with  $a = 1$

$$\text{and } r = \frac{5}{1} = \frac{25}{5} = \frac{125}{25} = 5$$

In a G.P. we have  $n$ th term =  $ar^{n-1}$

**PRACTICE TEST-II**

**Direction (1 to 25) :** In each of the following questions, a number series is given with one term missing. Choose the correct alternative that will continue the same pattern and replace the question mark in the given series.

1. 1, 9, 25, 49, ? 121  
(a) 64 (b) 81 (c) 91 (d) 100
2. 4, 7, 12, 19, 28, ?  
(a) 30 (b) 36 (c) 39 (d) 49
3. 6, 12, 21, ?, 48  
(a) 33 (b) 38 (c) 40 (d) 45
4. 6, 11, 21, 36, 56 ?  
(a) 42 (b) 51 (c) 81 (d) 91
5. 120, 99, 80, 63, 48, ?  
(a) 35 (b) 38 (c) 39 (d) 40
6. 22, 24, 28, ? , 52, 84  
(a) 36 (b) 38 (c) 42 (d) 46
7. 0, 2, 8, 14, ?, 34  
(a) 20 (b) 23 (c) 24 (d) 25
8. 28, 33, 31, 36, ?, 39  
(a) 32 (b) 34 (c) 38 (d) 40
9. 6, 17, 39, 72 ?  
(a) 83 (b) 94 (c) 116 (d) 127
10. 1, 4, 10, 22, 46 ?  
(a) 64 (b) 86 (c) 94 (d) 122
11. 4, 9, 25, ?, 121, 169, 289, 361  
(a) 49 (b) 64 (c) 81 (d) 87
12. 1, 1, 2, 6, 24, ? , 720  
(a) 100 (b) 104 (c) 108 (d) 120
13. 4, 6, 9,  $13\frac{1}{2}$ ?  
(a)  $17\frac{1}{2}$  (b) 19 (c)  $20\frac{1}{4}$  (d)  $22\frac{3}{4}$



14. 5760, 960, ?, 48, 16, 8  
(a) 120 (b) 160 (c) 192 (d) 240
15. 1, 2, 6, 7, 21, 22, 66, 67 ?  
(a) 70 (b) 134 (c) 201 (d) 301
16. 48, 24, 96, 48, 192 ?  
(a) 76 (b) 90 (c) 96 (d) 98
17. 9, 27, 31, 155, 161, 1127 ?  
(a) 316 (b) 1135 (c) 1288 (d) 2254
18. 2, 3, 3, 5, 10, 13, ?, 43, 172, 177  
(a) 23 (b) 38 (c) 39 (d) 40
19. 8, 28, 116, 584, ?  
(a) 1752 (b) 3502 (c) 3504 (d) 3508
20. 3, 7, 23, 95, ?  
(a) 62 (b) 128 (c) 479 (d) 575
21. 1, 5, 14, 30, 55, 91, ?  
(a) 130 (b) 140 (c) 150 (d) 160
22. 198, 194, 185, 169, ?  
(a) 92 (b) 112 (c) 136 (d) 144
23. 24, 60, 120, 210 ?  
(a) 300 (b) 336 (c) 420 (d) 525
24. 563, 647, 479, 815, ?  
(a) 672 (b) 386 (c) 279 (d) 143
25. 45, 54, 47, ?, 49, 56, 51, 57, 53  
(a) 48 (b) 50 (c) 55 (d) None of these

**ANSWERS**

1. (b) 2. (c) 3. (a) 4. (c) 5. (a) 6. (a) 7. (c) 8. (b) 9. (c) 10. (c)  
11. (a) 12. (d) 13. (c) 14. (c) 15. (c) 16. (c) 17. (b) 18. (c) 19. (d) 20. (c)  
21. (b) 22. (d) 23. (b) 24. (d) 25. (c)

**PRACTICE TEST-III****TYPE 3 : WRONG NUMBER SERIES**

Directions (1 to 5) : *In the following number series, one of the numbers does not fit into the series. Find the wrong number.*

1. 1788, 892, 444, 220, 112, 52, 24  
(a) 52 (b) 112 (c) 220 (d) 444 (e) 892.
2. 225, 289, 338, 374, 397, 415, 424  
(a) 415 (b) 289 (c) 338 (d) 374 (e) 397.
3. 5, 7.5, 11.25, 17.5, 29.75, 50, 91.25  
(a) 7.5 (b) 17.5 (c) 29.75 (d) 91.25  
(e) None of these.