

# தமிழ்நாடு முதலமைச்சரின் 11ஆம் வகுப்பு அரசு பள்ளிமாணவர்களுக்கான இலவச மாதிரி

**AUG 11 கணிதம் இலவச மாதிரி திறனறித் தேர்வு**

## SERIES COMPLETION

**Illustration 1 :** Find the missing term in the series:

3, 20, 63, 144, 275, ?

(A) 354 (B) 468 (C) 548 (D) 554

**Solution :** As discussed above, we may label the given series I and the form series II to IV as shown below:

|              |    |    |    |     |     |   |
|--------------|----|----|----|-----|-----|---|
| Series I :   | 3  | 20 | 63 | 144 | 275 | ? |
| Series II :  |    | 17 | 43 | 81  | 131 | ? |
| Series III : | 26 | 38 | 50 | ?   |     |   |
| Series IV :  |    | 12 | 12 |     |     |   |

Clearly, in series III successive term is increased by 12.

So, missing term in series III =  $50 + 12 = 62$ ;

missing term in series II =  $131 + 62 = 193$ ;

missing term in series I =  $275 + 193 = 468$ .

Thus, the missing term is 468. Hence, the answer is (B).

**Directions :** The terms given in each of the following questions follow a definite pattern and thus make a series. Find the missing number from the series out of the given alternatives.

**Illustration 2 :** 3, 6, 18, 72, (.....)

(A) 144 (B) 216 (C) 288 (D) 360

**Solution :** The pattern is  $\times 2, \times 3, \times 4, \dots$

Missing number =  $72 \times 5 = 360$ .

Hence, the answer is (D)

**Illustration 3 :** 121, 225, 361, (.....)

(A) 441 (B) 484 (C) 529 (D) 729

**Solution :** The numbers are  $11^2, 15^2, 19^2, \dots$

Missing number =  $(23)^2 = 529$ .

Hence, the answer is (C)

**Illustration 4 :** 1, 2, 3, 5, 8, (.....)

(A) 9 (B) 11 (C) 13 (D) 15

**Solution :** Each term in the series is the sum of the preceding two terms.

Therefore, the missing term =  $5 + 8 = 13$

Hence, the answer is (C)

**Illustration 5 :** 5, 9, 17, 29, 45, (.....)

(A) 60

(B) 65

(C) 68

(D) 70

**Solution :** The pattern is +4, +8, +12, +16, .....  
Missing number =  $45 + 20 = 65$   
Hence, the answer is (B)

**Illustration 6 :** 1, 9, 17, 33, 49, 73, (.....)

(A) 97

(B) 98

(C) 99

(D) 100

**Solution :** The pattern is +8, +8 + 16, +16, +24, ....  
Missing number =  $73 + 24 = 97$ .  
Hence, the answer is (A)

**Illustration 7 :** 1, 6, 13, 22, 33 (.....)

(A) 44

(B) 45

(C) 46

(D) 47

**Solution :** The pattern is +5, +7, +9, +11, .....  
Missing number =  $33 + 13 = 46$ .  
Hence, the answer is (C)

**Illustration 8 :** 20, 19, 17, (.....), 10, 5

(A) 12

(B) 13

(C) 14

(D) 15

**Solution :** The pattern is -1, -2, .....  
Missing number =  $17 - 3 = 14$ .  
Hence, the answer is (C)

**Illustration 9 :** 5, 16, 49, 104, (.....), 280

(A) 115

(B) 148

(C) 170

(D) 181

**Solution :** The pattern is + 11, + 33, + 55, ....., i.e.  $(11 \times 1)$ ,  $(11 \times 3)$ ,  $(11 \times 5)$ , .....  
Missing number =  $104 + (11 \times 7) = 181$ .  
Hence, the answer is (D)

**Illustration 10 :** 5, 17, 37, 65, (.....), 145

(A) 95

(B) 97

(C) 99

(D) 101

**Solution :** The numbers are  $2^2 + 1$ ,  $4^2 + 1$ ,  $6^2 + 1$ ,  $8^2 + 1$ , .....  $12^2 + 1$ , .....  
Missing number =  $10^2 + 1 = 101$ .  
Hence, the answer is (D)

**Illustration 11 :** 4, 10, (.....), 82, 244, 730

(A) 24

(B) 28

(C) 77

(D) 218

**Solution :** Each number in the series is the preceding number multiplied by 3 and then decreased by 2. Therefore, missing number =  $10 \times 3 - 2 = 30 - 2 = 28$   
Hence, the answer is (B)

**Illustration 12 :** Identify the number oddman out of the following numbers.

(A) 385      (B) 572      (C) 671      (D) 427

**Solution :** On careful observation of the above numbers, we notice that in all the numbers except 427, the middle digit is the sum of the first and last digits. In 427, this pattern is not followed. Hence, (D) 427 is an oddman.

**Illustration 13 :** Identify the wrong term in the following number series.

20      24      40      76      150      240

(A) 20      (B) 40      (C) 76      (D) 150

**Solution :**  
 $20 + 2^2 = 20 + 4 = 24$   
 $24 + 4^2 = 24 + 16 = 40$   
 $40 + 6^2 = 40 + 36 = 76$   
 $76 + 8^2 = 76 + 64 = 140 \neq 150$   
 $140 + 10^2 = 140 + 100 = 240$

Hence, the answer is (D)

**Illustration 14 :** Find the wrong term in the series:

26,    34,    41,    46,    56,    68,    80,    88

(A) 26      (B) 41      (C) 56      (D) 68

**Solution :** On carefully observing each term of the series, we notice that the sum of digits of a term is added to the same term to get the next term.

$26 + (2 + 6) = 34$   
 $34 + (3 + 4) = 41$   
 $41 + (4 + 1) = 46$   
 $46 + (4 + 6) = 56$   
 $56 + (5 + 6) = 67 \neq 68$   
 $67 + (6 + 7) = 80$   
 $80 + (8 + 0) = 88$

Hence, the answer is (D)

**Illustration 15 :** Identify the number which is different from others.

(A) 49      (B) 67      (C) 139      (D) 176

**Solution :** Sum of digits is 13 in all the numbers except in 176. Therefore, 176 is the oddman.

Hence, the answer is (D)

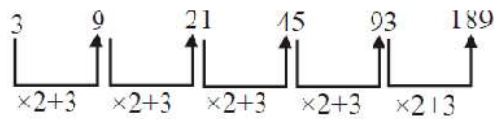
**Directions** - In the following Illustrations, one number series is given. There is another series in which a number and (a), (b), (c), (d), (e) are given below this series. You have to complete this second series by choosing the best from the given alternatives. This series will correlate with the first series.

**Illustration 16 :** 3      9      21      45      93      189  
5      (a)      (b)      (c)      (d)      (e)

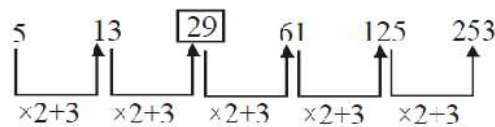
Which number can replace (b) from the following alternatives.

(A) 29      (B) 31      (C) 28      (D) 23

**Solution :**



Same way,



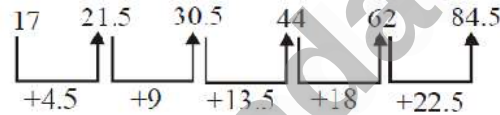
Hence, 29 will replace (b). Therefore Answer (A)

**Illustration 17:** 17      21.5      30.5      44      62      84.5  
21      (a)      (b)      (c)      (d)      (e)

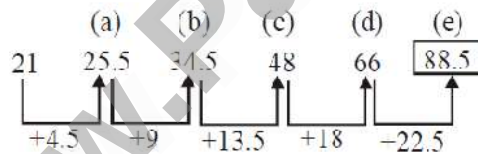
Which number can replace (e) ?

(A) 81      (B) 88.5      (C) 88      (D) 85

**Solution :**



Same way,



∴ 88.5 will replace (e). Therefore Answer (B)

**Illustration 18 :** 13    14    5    18    0.5    7.5  
                   19    (a)    (b)    (c)    (d)    (e)

Which number can replace (e) ?

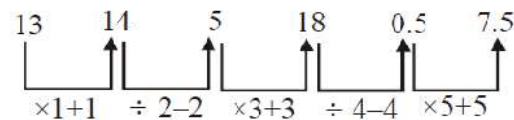
(A) 27

(B) 6.75

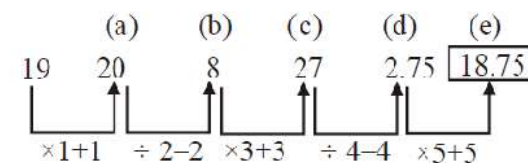
(C) 18.75

(D) 13.75

**Solution :**



Same way,



$\therefore$  18.75 will replace (e). Therefore Answer (C)

**Illustration 19:** 9    10    16    57    212    1085  
                   2    (a)    (b)    (c)    (d)    (e)

Which number can replace (c) ?

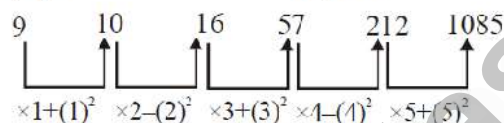
(A) 18

(B) 24

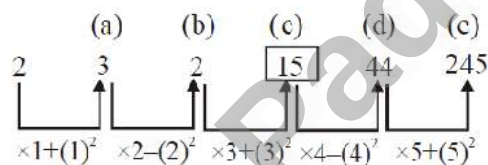
(C) 15

(D) 25

**Solution :**



Same way,



$\therefore$  15 will replace (c). Therefore Answer (C).

#### CASE-IV : ELEMENTARY IDEA OF PROGRESSIONS :

- (i) **Arithmetic Progression (A.P.):** The sequence of the form  $a, a + d, a + 2d, a + 3d, \dots$  is known as an Arithmetic Progression (A.P.), where  $a$  is called first term and  $d$  is called common difference.

For Example : 3, 6, 9, 12, ..... is an A.P. with  $a = 3$  and  $d = 6 - 3 = 3$ .

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

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

For Example : 1, 5, 25, 125, ..... is a G.P. with  $a = 1$  and  $r = \frac{5}{1} = \frac{25}{5} = 5$ .

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

**Illustration 20 :** In the Series 357, 363, 369, ..... what will be the 10th term?

(A) 405

(B) 411

(C) 413

(D) 417

**Solution :** The given series is an A.P. in which  $a = 357$  and  $d = 6$ .

$$\therefore 10\text{th term} = a + (10 - 1)d = a + 9d$$

$$= (357 + 9 \times 6) = (357 + 54) = 411.$$

Hence the answer is (B).

**Illustration 21 :** How many terms are there in the series 201, 208, 215, ....., 369, ?

(A) 23

(B) 24

(C) 25

(D) 26

**Solution :** The given series is A.P. in which  $a = 201$  and  $d = 7$ .

Let the number of terms be  $n$ .

$$\text{Then, } 369 = 201 + (n - 1) \times 7 \text{ or } n = 25.$$

Hence, the answer is (C).

**Illustration 22 :** In the series 7, 14, 28, ..... What will be the 10th term?

(A) 1792

(B) 2456

(C) 3584

(D) 4096

**Solution :** Clearly,  $7 \times 2 = 14$ ,  $14 \times 2 = 28$ , ..... and so on.

So, the given series is a G.P. in which  $a = 7$  and  $r = 2$ .

$$\therefore 10\text{th term} = ar^{(10-1)} = ar^9 = 7 \times 2^9 = 7 \times 512 = 3584.$$

Hence, the answer is (C).

**Illustration 23 :** Find the missing term in the given alphabet series :

H, I, K, N ?

(A) O

(B) Q

(C) R

(D) S

**Solution :** The pattern is  $H \xrightarrow{+1} I \xrightarrow{+2} K \xrightarrow{+3} N \xrightarrow{+4} R$

**Illustration 24 :** Which term comes next in the series : YEB, WFD, UHG, SKI, ?

(A) QOL

(B) QGL

(C) TOL

(D) QNL

**Solution :** Clearly, we observe the following pattern in the first, second and third letters of the given series :

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

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

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

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

**Illustration 25 :** Find the next term in the alpha-numeric series :

**Z1A, X2D, V6G, T21J, R88M, P445P, ?**

(A) N2676S (B) N2676T (C) T2670N (D) N2670S

**Solution :** Clearly, the patterns followed by the letters are as follows :

**1st letters :**  $Z \xrightarrow{-2} X \xrightarrow{-2} V \xrightarrow{-2} T \xrightarrow{-2} R \xrightarrow{-2} P \xrightarrow{-2} \textcircled{N}$

**2nd letters :**  $A \xrightarrow{+3} D \xrightarrow{+3} G \xrightarrow{+3} J \xrightarrow{+3} M \xrightarrow{+3} P \xrightarrow{+3} \textcircled{S}$

The series formed by the numerals i.e. 1, 2, 6, 21, 88, 445, ..... follows the pattern  $\times 1 + 1, \times 2 + 2, \times 3 + 3, \times 4 + 4, \times 5 + 5, \dots$

So, numeral in the desired term =  $445 \times 6 + 6 = 2676$ .

Hence, desired term is N2676S.

So, the answer is (A)

**Illustration 26 :** Find the term which does not fit into the series given below.

**G4T, J10R, M20P, P43N, S90L**

(A) G4T (B) J10R (C) M20P (D) P43N (E) S90L

**Solution :** The pattern followed by the letters are :

**1st letters :**  $G \xrightarrow{+3} J \xrightarrow{+3} M \xrightarrow{+3} P \xrightarrow{+3} S$

**3rd letters :**  $T \xrightarrow{-2} R \xrightarrow{-2} P \xrightarrow{-2} N \xrightarrow{-2} L$

The number series 4, 10, 20, 43, 90 should follow the pattern  $\times 2 + 1, \times 2 + 2, \times 2 + 3, \times 2 + 4$ .

So, 10 is wrong and must be replaced by  $(4 \times 2 + 1)$  i.e. 9

Thus, the term J10R does not fit in the given series. The correct term is J9R.

Hence, the answer is (B).

**Illustration 28 :**  $a - ba - bb - ab - a$ .

(A) aaba

(B) baab

(C) baaa

(D) abab

**Solution :** The pattern is abba|abba|abba.

Hence, the answer is (B).

**Illustration 29 :**  $r - sr - tsrrt - rr - sr$ .

(A) ttss

(B) tsst

(C) trst

(D) sstt

**Solution :** The pattern is rtst|rtst|rtst|rtst.

Hence, the answer is (C).

## PRACTICE QUESTIONS

**Direction (Q. 1 to 16) : Find the missing term(s) in the following questions :**

- Q.1 0, 6, 24, 60, 120, 210, ?  
(A) 290 (B) 240 (C) 504 (D) 336
- Q.2 1, 2, 5, 12, 27, 58, 121, ?  
(A) 246 (B) 247 (C) 249 (D) 248
- Q.3 19, 2, 38, 3, 114, 4, ?  
(A) 228 (B) 256 (C) 352 (D) 456
- Q.4 49, 51, 54, 27, 9, 11, 14, ?  
(A) 12 (B) 15 (C) 7 (D) 6
- Q.5 1, 4, 2, 8, 6, 24, 22, 88, ?  
(A) 86 (B) 90 (C) 154 (D) 352
- Q.6 600, 180, 54, ?  
(A) 27 (B) 0.18 (C) 18 (D) 16.2
- Q.7 2, 2, 5, 13, 28, ?  
(A) 49 (B) 50 (C) 51 (D) 52
- Q.8 24, 60, 120, 210, ?  
(A) 300 (B) 336 (C) 420 (D) 525
- Q.9 589654237, 89654237, 8965423, 965423, ?  
(A) 58965 (B) 65423 (C) 89654 (D) 96542

- Q.10 20, 20, 19, 16, 17, 13, 14, 11, ?, ?  
(A) 10, 10 (B) 10, 11 (C) 13, 14 (D) 13, 16
- Q.11 2, 1, 2, 4, 4, 5, 6, 7, 8, 8, 10, 11, ?  
(A) 9 (B) 10 (C) 11 (D) 12
- Q.12 90, 180, 12, 50, 100, 200, ?, 3, 50, 4, 25, 2, 6, 30, 3  
(A) 150 (B) 175 (C) 225 (D) 250
- Q.13  $\frac{2}{\sqrt{5}}, \frac{3}{5}, \frac{4}{5\sqrt{5}}, \frac{5}{25}, ?$   
(A)  $\frac{6}{5\sqrt{5}}$  (B)  $\frac{6}{25\sqrt{5}}$  (C)  $\frac{6}{125}$  (D)  $\frac{7}{125}$
- Q.14 2, 9, 28, ?, 126, 217, 344  
(A) 50 (B) 65 (C) 70 (D) 82
- Q.15 2, 12, 36, 80, 150, ?  
(A) 194 (B) 210 (C) 252 (D) 258
- Q.16 3, 10, 29, 66, 127, ?  
(A) 164 (B) 187 (C) 218 (D) 216

**Direction (Q.17 to 22) : Find the wrong term in the following questions :**

- Q.17 6, 13, 24, 51, 98, 201, 408  
(A) 13 (B) 51 (C) 201 (D) 408
- Q.18 2, 3, 4, 6, 12, 12, 48, 24, 250  
(A) 4 (B) 6 (C) 48 (D) 250
- Q.19 1112, 1314, 1516, 1718, 1921, 2122, 2324  
(A) 1516 (B) 1921 (C) 2122 (D) 2324
- Q.20 7, 28, 63, 124, 215, 342, 511  
(A) 7 (B) 28 (C) 124 (D) 342

Q.21 69, 55, 26, 13, 5  
(A) 5 (B) 13 (C) 26 (D) 55

Q.22 89, 78, 86, 80, 85, 82, 83  
(A) 83 (B) 82 (C) 86 (D) 78

**Direction (Q.23 to 26) :**

**Two series are given in which second series follows the pattern of first series.**

Q.23 5      6      11      17      28      45  
3      (a)      (b)      (c)      (d)      (e)

Which number can replace (d) ?

(A) 19 (B) 29 (C) 18 (D) 21

Q.24 2      10      14      34      62      130  
1      (a)      (b)      (c)      (d)      (e)

Which number can replace (b) ?

(A) 6 (B) 8 (C) 10 (D) 7

Q.25 4      2.25      3.25      7.125      18.25      51.875  
7      (a)      (b)      (c)      (d)      (e)

Which number can replace (b) ?

(A) 4.125 (B) 5.25 (C) 6.75 (D) 4.75

Q.26 3      40      176      537      1078      1079  
1      (a)      (b)      (c)      (d)      (e)

Which number can replace (e) ?

(A) 839 (B) 738 (C) 829 (D) 938

Q.27 In the series 10, 17, 24, 31, 38,.....which of the following will be a number of the series ?

(A) 45 (B) 48 (C) 574 (D) 1003

Q.28 In the series 3, 9, 15, ....., what will be the 21st term ?

(A) 117 (B) 121 (C) 123 (D) 129

Q.29 Which term of the series 5, 8, 11, 14, ..... is 320 ?

- (A) 104th (B) 105th (C) 106th (D) 64th

**Direction (Q.30 to 36)** In each of the following questions various terms of an alphabet series are given with one or more terms missing as shown by (?). Choose the missing terms out of the given alternatives.

Q.30 A, G, L, P, S, ?

- (A) U (B) W (C) X (D) Y

Q.31 A, B, N, C, D, O, E, F, P, ?, ?, ?

- (A) G, H, I (B) G, H, J (C) G, H, Q (D) J, K, L

Q.32 C, Z, F, X, I, V, L, T, O, ?, ?

- (A) O, P (B) P, Q (C) R, R (D) S, R

Q.33 GH, JL, NQ, SW, YD, ?

- (A) EJ (B) FJ (C) EL (D) FL

Q.34 PMT, OOS, NQR, MSQ, ?

- (A) LUP (B) LVP (C) LVR (D) LWP

Q.35 EJO, TYD, INS, XCH, ?

- (A) NRW (B) MRW (C) MSX (D) NXS

Q.36 ATIBUTION, TTRIBUTIO, RIBUTIO, IBUTI, ?

- (A) IBU (B) UT (C) UTI (D) BUT

**Direction (Q.37 to 39) :** In each of the following questions a letter number series is given with one or more terms missing as shown by (?). Choose the missing terms out of the given alternatives.

Q.37 C4X, F9U, I16R, ?

- (A) K25P (B) I.25P (C) I.25Q (D) I.27P

Q.38 2A11, 4D13, 12G17, ?

- (A) 36I19 (B) 36J21 (C) 48J21 (D) 48J23

Q.39 Z, ?, 25, Y, B, 23, X, C, ?, W, ?, 19, ?, E, 17

- (A) A, 21, D, V (B) A, 27, C, V (C) X, 21, C, W (D) X, 27, E, W

**Direction (Q.40 to 50) :** In each of the following letter series, some letters are missing which are given in that order as one of the alternatives below it. Choose the correct alternative.

Q.40 ab\_\_ baa\_\_ ab\_\_

- (A) aaaaa (B) aabaa (C) aabab (D) baabb

Q.41 aba cabc dcha baba

- (A) abdca (B) bcadc (C) abcdcd (D) cbdaa

Q.42 \_\_bcdbc\_\_ dcabd\_\_ \_\_bcdbc\_\_ dcdbd

- (A) aaaaa (B) ccccc (C) bbbbb (D) ddddd

Q.43 b\_\_ac\_\_cc\_\_cb\_\_ab\_\_ac

- (A) chaba (B) bbaac (C) abbbc (D) aabba

Q.44 abc\_\_d\_\_bc\_\_d\_\_b\_\_cda

- (A) bacde (B) cdabe (C) dacab (D) decdh

Q.45 b\_\_cacca\_\_ba\_\_bbc\_\_bc\_\_a

- (A) baabc (B) abaaa (C) acbca (D) bacab

- Q.46 a \_ c \_ abb \_ a \_ bc \_ bc \_ ab  
(A) cbcaaa (B) bcccab (C) bccaac (D) acbabc
- Q.47 a \_ bc \_ c \_ abb \_ bca \_  
(A) cccbc (B) cbbac (C) accba (D) abbba
- Q.48 c — bba — cab — ac — ab — ac  
(A) abc bc (B) babcc (C) bcacb (D) acbcb
- Q.49 R — S — T — KSK — RK — KT.  
(A) RKRTS (B) KKRTS (C) KKTRS (D) KRSTU
- Q.50 Λ — CG — IM — O — TU — ZΛ.  
(A) BHNYS (B) BHNSY (C) HNSYS (D) BHINS

**Direction (Q.51 to 52) :** In each of the following questions, three sequence of letters/numerals are given which correspond to each other in some way. In each question, you have to find out the letters/numerals that come in the vacant places marked by (?). These are given as one of the four alternatives under the question.

- Q.51 C B \_ \_ D \_ B A B C C B  
\_ \_ 1 2 4 3 \_ \_ ? ? ? ?  
a \_ a b \_ c \_ b \_ \_ \_  
(A) 3, 4, 4, 3 (B) 3, 2, 2, 3 (C) 3, 1, 1, 3 (D) 1, 4, 4, 1
- Q.52 \_ A C \_ B D \_ C D C D  
2 \_ 4 1 \_ 1 4 \_ \_ \_  
c d \_ b c \_ a ? ? ? ?  
(A) a, b, a, b (B) a, c, a, c (C) c, b, c, b (D) c, d, c, d