Chapter 6

4 Marks

SEQUENCE AND SERIES

TOPIC : SEQUENCE

SERIES

ARITHMETIC PROGRESSIONS

GEOMETRIC PROGRESSIONS

BY : SHIVANI SHARMA

SHIVANI SHARMA

QUANTITATIVE APTITUDE ROMANOVA

- 7 years of experience in teaching Mathematics
- Gold Medalist in M.Sc. and B.Sc. Maths
- Was #1 Maths Faculty in Magnet Brains
- Teaches Maths in CA foundation and K-12
- Taught 30000+ students with highest score as 100

(1) 28, 2, 25, 27, —-

(2) 2,7, 11, 19, 31, 51, —-

Not Sequence

(3) 1, 2, 3, 4, 5, 6, —---

(4) 20, 18, 16, 14, 12, 10, -—--

Sequence

SEQUENCE

An ordered collection of numbers $a_1, a_2, a_3, a_4, \ldots\ldots\ldots a_n \ldots\ldots\ldots$ is a sequence if according to some definite rule or law, there is a definite value of a_n called the term or element of the sequence, corresponding to any value of the natural number n.

SEQUENCE

- a_1 is the 1st term of the sequence, a_2 is the 2nd term, a_n is the nth term.

- In the nth term a_n by putting n = 1, 2, 3..... successively, we get a_1, a_2 a_3, a_4,.....

- The nth term is also called the general term of the sequence.
- To specify a sequence, nth term must be known.

SEQUENCE

FINITE

- If the number of elements in a sequence is finite, the sequence is called finite sequence
- $a_1, a_2, a_3, a_4, \ldots\ldots\ldots, a_n$

  denoted by $\{a_i\}^n_{i=1}$
- **Example :** 2, 4, 6, 8, 10.

INFINITE

- If the number of elements is unending, the sequence is infinite
- $a_1, a_2, a_3, a_4, \ldots\ldots\ldots, a_n \ldots\ldots\ldots$

  denoted by $\{a_n\}^\infty_{n=1}$ or simply by $\{a_n\}$
- **Example :** 1, 3, 5, 7, ……

EXAMPLES

FINITE SEQUENCE

- **A sequence of even positive integers within 12 i.e., is**

  2, 4, 6, 8, 10.

- **A sequence of odd positive integers within 11 i.e., is**

  1, 3, 5, 7, 9.

EXAMPLES

INFINITE SEQUENCE

- The sequence $\{1/n\}$ is 1, 1/2, 1/3, 1/4.....
- The sequence $\{(-1)^n n\}$ is −1, 2, −3, 4, −5,.....
- The sequence $\{n\}$ is 1, 2, 3,.....
- The sequence $\{n / (n + 1)\}$ is 1/2, 2/3, 3/4, 4/5.....
- A sequence of even positive integers is 2, 4, 6, ...
- A sequence of odd positive integers is 1, 3, 5, 7, ...

SERIES

- An expression of the form $a_1 + a_2 + a_3 + ... + a_n + ...$

  which is the sum of the elements of the sequence $\{a_n\}$ is called a ***series.***

- Example : $1 + 3 + 5 + 7 + ...$
- If the series contains a finite number of elements, it is called a ***finite series***, otherwise called an ***infinite series***.

ARITHMETIC PROGRESSIONS (AP)

- 2 , 5 , 8 , 11 , 14 , 17,.....

- 15 , 13 , 11 , 9 , 7, 5 , 3 , 1, –1

- 2 , 2 , 2 , 2 , 2 .....

- A sequence $a_1, a_2, a_3, ... a_n$ is called an Arithmetic Progression (A.P.) when

  $a_2 - a_1 = a_3 - a_2 = a_n - a_{n-1}$

- A. P. is a sequence in which each term is obtained by adding a constant d to the preceding term.
- This constant 'd' is called the ***common difference*** of the A.P
- d can be positive , negative, zero

ARITHMETIC PROGRESSIONS (AP)

GENERAL FORM OF AP

- $a_1, a_2, a_3, a_4, a_5 \ldots\ldots$
- Here

$a_1 = a$

$a_2 = a + d$

$a_3 = a + 2d$

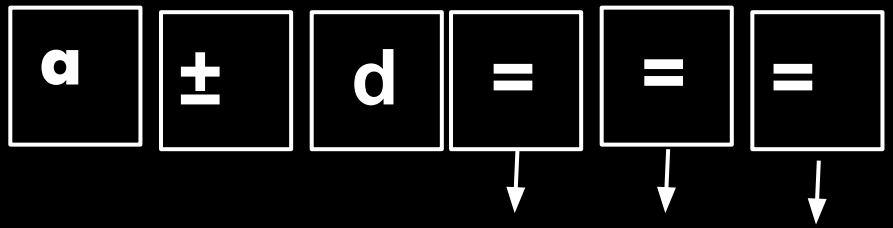
-
-
-

nth term of AP/ General term of AP

$$a_n = a + (n-1)\,d$$

Example 1 Find the 7th term of the A.P. 8, 5, 2, -1, -4,.....

CALCULATOR TRICK TO FIND nth TERM OF AN AP



- If d is positive take + or if d is negative take –

Example 2 Which term of AP $\frac{3}{\sqrt{7}}, \frac{4}{\sqrt{7}}, \frac{5}{\sqrt{7}}$ .....is $\frac{17}{\sqrt{7}}$?

Page No 6.4

Example 3 If 5^{th} and 12^{th} terms of an A.P. are 14 and 35 respectively, find the A.P.

ARITHMETIC PROGRESSIONS (AP)

- nth term from the end of an AP — $\{l - (n - 1)\, d\}$
- THREE NUMBERS IN AP — $(a - d)\,,\ a\ ,\ (a + d)$
- FOUR NUMBERS IN AP — $(a - 3d)\,,\ (a - d)\,,\ (a + d)\,,\ (a + 3d)$

Example 4 Divide 69 into three parts which are in A.P. and are such that the product of the first two parts is 483

ARITHMETIC PROGRESSIONS (AP)

- If 3 numbers a, b, c are in A.P., we say

  $b - a = c - b$ or $a + c = 2b$;

  b is called the arithmetic mean between a and c.

Example Find the arithmetic mean between 4 and 10.

ARITHMETIC PROGRESSIONS (AP)

SUM OF First n terms of AP

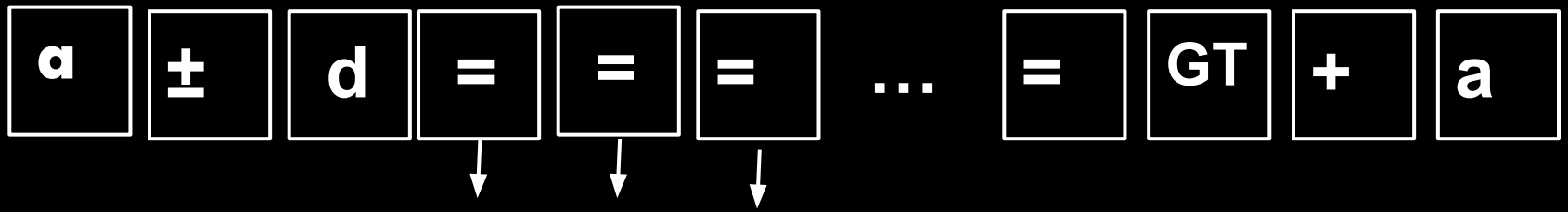
- Let S be the Sum,
- a be the 1st term and
- l be the last term of an A.P.
- If the number of term is n, then $a_n = l$.
- Let d be the common difference of the A.P.

$$S = \frac{n}{2}\{2a + (n-1)d\}$$

- $S = n(a + l)/2$

Find the sum of 23 terms of the AP 5, 9,13,17 ,.....

CALCULATOR TRICK TO FIND Sum of First n TERMs OF AN AP



- If d is positive take + or if d is negative take –

Find the sum of the series : 5 + 13 + +21 + ……. + 181

ARITHMETIC PROGRESSIONS (AP)

Result

$$a_n = S_n - S_{n-1}$$

RESULTS

$$1 + 2 + 3 + \ldots\ldots + n = \frac{n(n+1)}{2}.$$

$$1 + 3 + 5 + \ldots + (2n - 1) = n^2$$

$$1^2 + 2^2 + 3^2 + \ldots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

$$1^3 + 2^3 + 3^3 + \ldots + n^3 = \left\{\frac{n(n+1)}{2}\right\}^2$$

TRICKS

- How many 3 digit numbers are divisible by 7?

Ans : 128

STEP 1: Write first and last 3 digit number

100 and 999

Step 2 : Divide both by 7

100/7 = 14.2857

999/7 = 142.714

Step 3 : Avoid decimal and Subtract

142 - 14 = 128

JUNE 2023

Que. How many number between 74 and 25,556 are divisible by 5?

(a) 5090

(b) 5097

(c) 5095

(d) 5075

Ans : b

TRICKS

If the ratio between the sum of n terms of two AP is (7n +1) : (4n + 27) , find the ratio of their 11^{th} term

Sol : Ratio of their 11 th term is

$$\frac{7(21)+1}{4(21)+27} = \frac{148}{111}$$

we need to find ratio of 11^{th} term

Step 1 : multiply 11 by 2 and subtract 1

$2 \times 11 - 1 = 21$

Step 2 : In the given ratio substitute your n by 21 and get your answer

JUNE 2019

Que. The ratio of sum of n terms of the two AP's is (n+1) : (n-1) then the ratio of their mth term is

(a) (m+1) : 2m

(b) (m+1) : (m-1)

(c) (2m-1) : (m+1)

(d) m : (m-1)

Ans : d

TRICKS

If 9 times 9^{th} term of an AP is equal to 13 times the 13^{th} term then the 22^{nd} term of an AP is ?

Ans : 0

If m times the mth term of an AP is equal to n times the n^{th} term , then $(m + n)^{th}$ term of the AP is 0

$$m\,a_m = n\,a_n$$

$$a_{m+n} = 0$$

TRICKS

If $a_{64} = 13$ and $a_{13} = 64$, find $a_{101} = ?$

Ans : - 24

If m^{th} term of a given AP is n and its n^{th} term is m then its pth term is (n + m - p)

$$a_m = n$$

$$a_n = m$$

$$a_p = (n+m-p)$$

EXERCISE 6(A)

Choose the most appropriate option (a), (b), (c) or (d)

Que. 1 The nth element of the sequence 1, 3, 5, 7,..... is

(a) n

(b) 2n−1

(c) 2n +1

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 2 The nth element of the sequence −1, 2, −4, 8..... is

(a) $(-1)^n 2^{n-1}$

(b) 2^{n-1}

(c) 2^n

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 3 $\sum_{i=4}^{7} \sqrt{2i-1}$ can be written as

(a) $\sqrt{7} + \sqrt{9} + \sqrt{11} + \sqrt{13}$

(b) $2\sqrt{7} + 2\sqrt{9} + 2\sqrt{11} + 2\sqrt{13}$

(c) $2\sqrt{7} + 2\sqrt{9} + 2\sqrt{11} + 2\sqrt{13}$

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 4 The sum to ∞ of the series −5, 25, −125, 625, ... can be written as

(a) $\sum_{k=1}^{\infty} (-5)^k$

(b) $\sum_{k=1}^{\infty} 5^k$

(c) $\sum_{k=1}^{\infty} -5^k$

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 5 The first three terms of sequence when nth term t_n is $n^2 - 2n$ are

(a) −1, 0, 3

(b) 1, 0, 2

(c) −1, 0, −3

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 6 Which term of the progression −1, −3, −5, ... is −39

(a) 21^{st}

(b) 20^{th}

(c) 19^{th}

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 7 The value of x such that 8x + 4, 6x − 2, 2x + 7 will form an AP is

(a) 15

(b) 2

(c) 15/2

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 8 The m^{th} term of an A. P. is n and n^{th} term is m. The r^{th} term of it is

(a) m + n + r

(b) n + m − 2r

(c) m + n + r/2

(d) m + n − r

Choose the most appropriate option (a), (b), (c) or (d)

Que. 9 The number of the terms of the series $10 + 9\frac{2}{3} + 9\frac{1}{3} + 9 + ...$ will amount to 155 is

(a) 30

(b) 31

(c) 32

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 10 The nth term of the series whose sum to n terms is $5n^2 + 2n$ is

(a) 3n – 10

(b) 10n – 2

(c) 10n – 3

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 11 The 20^{th} term of the progression 1, 4, 7, 10 ..... is

(a) 58

(b) 52

(c) 50

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 12 The last term of the series 5, 7, 9, ... to 21 terms is

(a) 44

(b) 43

(c) 45

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 13 The last term of the A.P. 0.6, 1.2, 1.8, ... to 13 terms is

(a) 8.7

(b) 7.8

(c) 7.7

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 14 The sum of the series 9, 5, 1, ... to 100 terms is

(a) -18,900

(b) 18,900

(c) 19,900

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 15 The two arithmetic means between −6 and 14 is

(a) 2/3, 1/3

(b) 2/3, $7\frac{1}{3}$

(c) −2/3, $-7\frac{1}{3}$

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 16 The sum of three integers in AP is 15 and their product is 80. The integers are

(a) 2,8,5

(b) 8,2,5

(c) 2,5,8

(d) 8,5,2

Choose the most appropriate option (a), (b), (c) or (d)

Que. 17 The sum of n terms of an AP is $3n^2 + 5n$. The series is

(a) 8, 14, 20, 26

(b) 8, 22, 42, 68

(c) 22, 68, 114, ...

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 18 The number of numbers between 74 and 25,556 divisible by 5 is

(a) 5,090

(b) 5,097

(c) 5,095

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 19 The pth term of an AP is (3p – 1)/6. The sum of the first n terms of the AP is

(a) n (3n+1)

(b) n(3n+1)/12

(c) n/12 (3n–1)

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 20 The arithmetic mean between 33 and 77 is

(a) 50

(b) 45

(c) 55

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 21 The 4 arithmetic means between −2 and 23 are

(a) 3, 13, 8, 18

(b) 18, 3, 8, 13

(c) 3, 8, 13, 18

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 22 The first term of an A.P is 14 and the sums of the first five terms and the first ten terms are equal in magnitude but opposite in sign. The 3^{rd} term of the AP is

(a) $6\frac{4}{11}$

(b) 6

(c) 4/11

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 23 The sum of a certain number of terms of an AP series −8, −6, −4..... is 52. The number of terms is

(a) 12

(b) 13

(c) 11

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 24 The first and the last term of an AP are −4 and 146. The sum of the terms is 7171. The number of terms is

(a) 101

(b) 100

(c) 99

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que. 25 The sum of the series $3\frac{1}{2} + 7 + 10\frac{1}{2} + 14 + \ldots$ to 17 terms is

(a) 530

(b) 535

(c) $535\frac{1}{2}$

(d) none of these

Nov 2018

Que. If pth term of an AP is q and its qth term is p , then what will be the value of r th term?

(a) p + q +r

(b) p + q – r

(c) p – q – r

(d) p+q

Ans : b

Dec 2022

Que. If pth term of an AP is q and its qth term is p , then what will be the value of (p + q)th term?

(a) 0

(b) 1

(c) p+q−1

(d) 2(p+q−1)

Ans : a

Dec 2019

Que. The sum of five terms of AP is 75 . find the 3rd term

(a) 20

(b) 30

(c) 15

(d) None of these

Ans : c

June 2022

Que. The first and last terms of an AP are 5 and 905 . Sum of the terms is 45, 955 . The number of terms is

(a) 99

(b) 100

(c) 101

(d) 102

Ans : c

July 2021

Que. If the sum of ‘n ‘ terms of an AP is $2n^2$, the fifth term is

(a) 20

(b) 50

(c) 18

(d) 25

Ans : c

Jan 2021

Que. The nth terms of the series 3 + 7 + 13 + 21 + 31 + ... is

(a) 4n-1

(b) n^2 +2n

(c)n^2 + n + 1

(d) n^3 + 2

Ans : c

June 2023

Que. If 9th and 19th term of an AP are 35 and 75 , respectively , then its 20 term is

(a) 78

(b) 79

(c) 80

(d) 81

Ans : b

June 2022

Que. If nth term of the AP 9, 7, 5.... Is same as the nth term of the AP 15, 12, 9....., then n will be

(a) 7

(b) 9

(c) 15

(d) 11

Ans : a

Nov 2018

Que. The value of K , for which the terms 7K + 3 , 4K − 5 , 2K + 10 are in AP is

(a) −13

(b) −23

(c) 13

(d) 23

Ans : b

Dec 2015

Que. Three NO's a ,b , c are in AP find a - b + c

(a) a

(b) - b

(c) b

(d) c

Ans : c

May 2018

Que. Insert two Arithmetic means between 68 and 260

(a) 132 , 196

(b) 130 , 194

(c) 70 , 258

(d) none

Ans : a

DEC 2021

Que. The sum of series 7 + 14 + 21 + ... to 17th term is :

(a) 1071

(b) 971

(c) 1171

(d) 1271

Ans : a

GEOMETRIC PROGRESSIONS (GP)

- 5, 15, 45, 135, ...
- 1, 1/2, 1 /4 , 1/8 ...
- 2,– 6, 18, –54, ...

- A sequence $a_1 , a_2 , a_3 , \ldots\ldots\ldots\ldots, a_n$ is called geometric progression , if each term is nonzero and $\frac{a_{k+1}}{a_k} = r$ (constant) for all $k \geq 1$
- The constant ratio is called its common ratio

GEOMETRIC PROGRESSIONS (GP)

- In a GP we usually denote the first term by a , common ratio by r and the nth term by a_n

The nth term of a GP is called its general term

GEOMETRIC PROGRESSIONS (GP)

Example

- 1 + 4 + 16 + 64 + ...

GEOMETRIC SERIES

Dec 2014

Que. If x, y, z are the terms in G.P. then the terms $x^2 + y^2$, $xy + yz$, $y^2 + z^2$ are in

(a) A.P.

(b) G.P.

(c) H.P.

(d) None of these.

Ans : b

June 2015

Que. If S be the sum, P the product and R is the sum of reciprocals of n terms in G.P then $P^2 R^n$ = _____.

(a) S^{2n}

(b) S^n

(c) S^{-2n}

(d) S^{-n}

Ans : b

Dec 2020

Que. Three numbers in G.P. with their Sum 130 and their product 27,000 are:

(a) 10, 30, 90

(b) 90, 30, 10

(c) (a) and (b) both

(d) 10, 20, 30

Ans : c

GEOMETRIC PROGRESSIONS (GP)

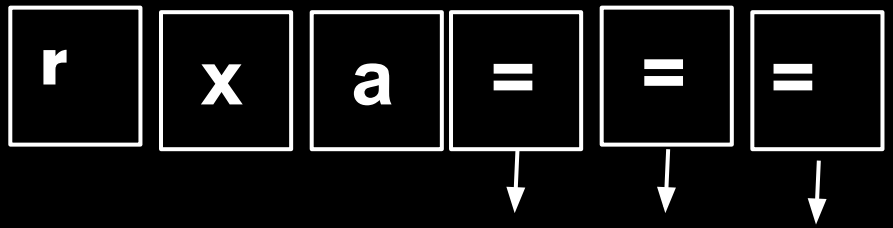
nth term of a GP

- Let us consider a GP with first term a and common ratio r

$a , ar , ar^2 , ar^3, \ldots\ldots\ldots\ldots\ ar^{n-1}$

$$a_n = ar^{n-1}$$

CALCULATOR TRICK TO FIND nth TERM OF GP



2^{nd} term , 3^{rd} term , 4^{th} term , ...so on

June 2019

Que. In a G.P. If the fourth term is '3' then the product of first seven terms is

(a) 3^5

(b) 3^7

(c) 3^6

(d) 3^8

Ans : b

Dec 2011

Que. If 5^{th} term of a G.P. is $\sqrt[3]{3}$, then the product of first nine terms is

(a) 8

(b) 27

(c) 243

(d) 9

Ans : b

June 2015

Que. If S be the sum, P the product and R is the sum of reciprocals of n terms in G.P then $P^2 R^n$ = _____.

(a) S^{2n}

(b) S^n

(c) S^{-2n}

(d) S^{-n}

Ans : b

Dec 2022

Que. In a GP 5^{th} term is 27 and 8^{th} term is 729. Find its 11^{th} term?

(a) 729

(b) 6561

(c) 2187

(d) 19683

Ans : d

GEOMETRIC PROGRESSIONS (GP)

- nth term from the end of a GP with first term a , common ratio r and last term l

$$\frac{l}{r^{(n-1)}}$$

- 3 Numbers in GP

$$\frac{a}{r} \ , \ a \ , \ ar$$

GEOMETRIC PROGRESSIONS (GP)

GEOMETRIC MEAN

- If a, b, c are in G.P

  we get ,

  $b/a = c/b \Rightarrow b^2 = ac$,

  $b = \sqrt{ac}$

  b is called the geometric mean between a and c .

Dec 2010

Que. If G be Geometric Mean between two numbers a and b, then the value of $\frac{1}{G^2-a^2}+\frac{1}{G^2-b^2}$ is equal to

(a) G^2

(b) $3G^2$

(c) $1/G^2$

(d) $2/G^2$

Ans : c

GEOMETRIC PROGRESSIONS (AP)

SUM OF n TERMS OF A GP

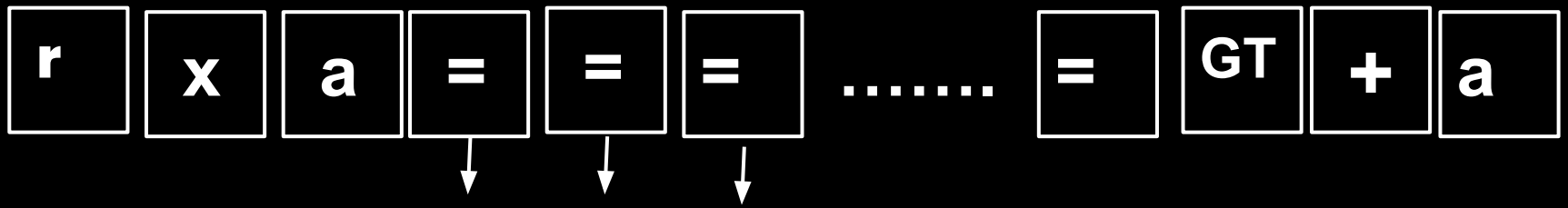
Let a be the first term and r be the common ratio. So the first n terms are a, ar, ar^2, ... ar^{n-1}.

If S be the sum of n terms,

$S_n = a + ar + ar^2 + \ldots\ldots + ar^{n-1}$ .....(i)

$$S_n = \begin{cases} na, \text{ when } r = 1; \\ \dfrac{a(1-r^n)}{(1-r)}, \text{ when } r < 1; \\ \dfrac{a(r^n-1)}{(r-1)}, \text{ when } r > 1. \end{cases}$$

CALCULATOR TRICK TO FIND Sum of n TERMS OF A GP



June 2017

Que. The sum of first 20 terms of a GP is 1025 times the sum of first 10 terms of same GP then common ratio is:

(a) $\sqrt{2}$

(b) 2

(c) $2\sqrt{2}$

(d) 1/2

Ans : b

June 2017

Que. A GP consists of 2n terms . If the sum of terms occupying the odd places is S_1 and that of the terms in even places is S_2 . The common ratio of the progression is

(a) n

(b) $2S_1$

(c) S_2/S_1

(d) S_1 / S_2

Ans : C

GEOMETRIC PROGRESSIONS (AP)

SUM OF INFINITE GEOMETRIC SERIES

$$S_{\infty} = \frac{a}{1-r}, \text{ if } -1<r<1.$$

June 2011

Que. Find the product of :

$$(243).(243)^{1/6}.(243)^{1/36}\ldots\ldots \text{ to } \infty$$

(a) 1,024

(b) 27

(c) 729

(d) 246

Ans : c

Dec 2012

Que. The first term of a GP where second term is 2 and sum of infinite term is 8 will be

(a) 6

(b) 3

(c) 4

(d) 1

Ans : c

EXERCISE 6 (B)

Choose the most appropriate option (a), (b), (c) or (d)

Que1. The 7^{th} term of the series 6, 12, 24,.....is

(a) 384

(b) 834

(c) 438

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que3. t_{12} of the series -128, 64, -32, ... is

(a) - 1/16

(b) 16

(c) 1/16

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 4. The 4^{th} term of the series 0.04, 0.2, 1, ... is

(a) 0.5

(b) 1/2

(c) 5

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 5. The last term of the series 1, 2, 4,.... to 10 terms is

(a) 512

(b) 256

(c) 1024

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 6. The last term of the series 1, −3, 9, −27 up to 7 terms is

(a) 297

(b) 729

(c) 927

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 7. The last term of the series x^2, x, 1, ... to 31 terms is

(a) $\times^{28}$

b) 1/×

(c) $1/\times^{28}$

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 8. The sum of the series −2, 6, −18, ... to 7 terms is

(a) −1094

(b) 1094

(c) −1049

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 9. The sum of the series 243, 81, 27, ... to 8 terms is

(a) 36

(b) (36 13/30)

(c) 36 1/9

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 10. The sum of the series $\frac{1}{\sqrt{3}}+1+\frac{3}{\sqrt{3}}+\ldots\ldots$ to 18 terms is

(a) $9841\,\frac{(1+\sqrt{3})}{\sqrt{3}}$

(b) 9841

(c) $\frac{9841}{\sqrt{3}}$

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 11. The second term of a G P is 24 and the fifth term is 81. The series is

(a) 16, 36, 24, 54,

(b) 24, 36, 53,...

(c) 16, 24, 36, 54,

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 12. The sum of 3 numbers of a G P is 39 and their product is 729. The numbers are

(a) 3, 27,9

(b) 9, 3, 27

(c) 3, 9, 27

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 13. In a G. P, the product of the first three terms is 27/8. The middle term is

(a) 3/2

(b) 2/3

(c) 2/5

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 14. If you save 1 paise today, 2 paise the next day 4 paise the succeeding day and so on, then your total savings in two weeks will be

(a) ₹ 163

(b) ₹ 183

(c) ₹ 163.83

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 15. Sum of n terms of the series 4 + 44 + 444 + ... is

(a) $4/9 \{10/9 (10^n - 1) - n\}$

(b) $10/9 (10^n - 1) - n$

(c) $4/9 (10^n - 1) - n$

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 16. Sum of n terms of the series 0.1 + 0.11 + 0.111 + ... is

(a) $1/9\ (n- (1- (0.1)^n)\}$

(b) $1/9\ \{n - (1-(0.1)^n/9\}$

(c) $n - 1 - (0.1)^n/9$

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 17. The sum of the first 20 terms of a G. P is 244 times the sum of its first 10 terms. The common ratio is

(a) $\pm\sqrt{3}$

(b) ± 3

(c) $\sqrt{3}$

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 18. Sum of the series 1 + 3 + 9 + 27 +....is 364. The number of terms is

(a) 5

(b) 6

(c) 11

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 19. The product of 3 numbers in G P is 729 and the sum of squares is 819. The numbers are

(a) 9, 3, 27

(b) 27,3,9

(c) 3, 9, 27

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 20. The sum of the series 1 + 2 + 4 + 8 + .. to n term

(a) $2^n - 1$

(b) 2n – 1

(c) $1/2^n - 1$

(d) none of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 21. The sum of the infinite GP 14, – 2, + 2/7, – 2/49, + ... is

(a) 4 1/12

(b) 12 1/4

(c) 12

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que22. The sum of the infinite G. P. 1 – 1/3 + 1/9 – 1/27 +... is

(a) 0.33

(b) 0.57

(c) 0.75

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 23. The number of terms to be taken so that 1 + 2 + 4 + 8 + will be 8191 is

(a) 10

(b) 13

(c) 12

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 24. Four geometric means between 4 and 972 are

(a) 12, 36, 108, 324

(b) 12, 24, 108, 320

(c) 10, 36, 108, 320

(d) none of these

EXERCISE 6 (C)

Choose the most appropriate option (a), (b), (c) or (d)

Que 1. Three numbers are in AP and their sum is 21. If 1, 5, 15 are added to them respectively, they form a G. P. The numbers are

(a) 5, 7, 9

(b) 9, 5, 7

(c) 7, 5, 9

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 2. The sum of $1 + 1/3 + 1/3^2 + 1/3^3 + \ldots + 1/3^{n-1}$ is

(a) 2/3

(b) 3/2

(c) ¾

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 3. The sum of the infinite series 1 + 2/3 + 4/9 + .. is

(a) 1/3

(b) 3

(c) 2/3

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 4. The sum of the first two terms of a G.P. is 5/3 and the sum to infinity of the series is 3. The common ratio is

(a) 1/3

(b) 2/3

(c) – 2/3

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 5. If p, q and r are in A.P. and x, y, z are in G.P. then $x^{q-r} \cdot y^{r-p} \cdot z^{p-q}$ is equal to

(a) 0

(b) –1

(c) 1

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 6. The sum of three numbers in G.P. is 70. If the two extremes by multiplied each by 4 and the mean by 5, the products are in AP. The numbers are

(a) 12, 18, 40

(b) 10, 20, 40

(c) 40, 20, 10

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 7. The sum of 3 numbers in A.P. is 15. If 1, 4 and 19 be added to them respectively, the results are is G. P. The numbers are

(a) 26, 5, –16

(b) 2, 5, 8

(c) 5, 8, 2

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 8. Given x, y, z are in G.P. and $x^p = y^q = z^\sigma$, then 1/p , 1/q, 1/σ are in

(a) A.P.

(b) G.P.

(c) Both A.P. and G.P.

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 9. If the terms 2x, (x + 10) and (3x + 2) be in A.P., the value of x is

(a) 7

(b) 10

(c) 6

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 10. If A be the A.M. of two positive unequal quantities x and y and G be their G. M, then

(a) $A < G$

(b) $A > G$

(c) $A \geq G$

(d) $A \leq G$

Choose the most appropriate option (a), (b), (c) or (d)

Que 11. The A.M. of two positive numbers is 40 and their G. M. is 24. The numbers are

(a) (72, 8)

(b) (70, 10)

(c) (60, 20)

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 12. Three numbers are in A.P. and their sum is 15. If 8, 6, 4 be added to them respectively, the numbers are in G.P. The numbers are

(a) 2, 6, 7

(b) 4, 6, 5

(c) 3, 5, 7

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 13. The sum of four numbers in G. P. is 60 and the A.M. of the first and the last is 18. The numbers are

(a) 4, 8, 16, 32

(b) 4, 16, 8, 32

(c) 16, 8, 4, 20

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 14. A sum of ₹ 6240 is paid off in 30 instalments such that each instalment is ₹ 10 more than the preceding installment. The value of the 1 instalment is st

(a) ₹ 36

(b) ₹ 30

(c) ₹ 60

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 15. The sum of $1.03 + (1.03)^2 + (1.03)^3 + \ldots$ to n terms is

(a) $103\{(1.03)^n - 1\}$

(b) $103/3\{(1.03)^n - 1\}$

(c) $(1.03)^n - 1$

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 16. If x, y, z are in A.P. and x, y, (z + 1) are in G.P. then

(a) $(x - z)^2 = 4x$

(b) $z^2 = (x - y)$

(c) $z = x - y$

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 17. The numbers x, 8, y are in G.P. and the numbers x, y, –8 are in A.P. The value of x and y are

(a) (–8, –8)

(b) (16, 4)

(c) (8, 8)

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 18. The n^{th} term of the series 16, 8, 4,.... in $1/2^{17}$. The value of n is

(a) 20

(b) 21

(c) 22

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 19. The sum of n terms of a G.P. whose first terms 1 and the common ratio is 1/2 , is equal to 1 127/128. The value of n is

(a) 7

(b) 8

(c) 6

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 20. t_4 of a G.P. in x, t_{10} = y and t_{16} = z. Then

(a) $x^2 = yz$

(b) $z^2 = xy$

(c) $y^2 = zx$

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 21. If x, y, z are in G.P., then

(a) $y^2 = xz$

(b) $y(z^2 + x2) = x(z^2 + y^2)$

(c) $2y = x + z$

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 22. The sum of all odd numbers between 200 and 300 is

(a) 11,600

(b) 12,490

(c) 12,500

(d) 24,750

Choose the most appropriate option (a), (b), (c) or (d)

Que 23. The sum of all natural numbers between 500 and 1000 which are divisible by 13, is

(a) 28,405

(b) 24,805

(c) 28,540

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 24. If unity is added to the sum of any number of terms of the A.P. 3, 5, 7, 9,..... the resulting sum is

(a) 'a' perfect cube

(b) 'a' perfect square

(c) 'a' number

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 25. The sum of all natural numbers from 100 to 300 which are exactly divisible by 4 or 5 is

(a) 10,200

(b) 15,200

(c) 16,200

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 26. The sum of all natural numbers from 100 to 300 which are exactly divisible by 4 and 5 is

(a) 2,200

(b) 2,000

(c) 2,220

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 27. A person pays ₹ 975 by monthly instalment each less than the former by ₹ 5. The first instalment is ₹ 100. The time by which the entire amount will be paid is

(a) 10 months

(b) 15 months

(c) 14 months

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que28. A person saved ₹ 16,500 in ten years. In each year after the first year he saved ₹ 100 more than he did in the preceding year. The amount of money he saved in the 1^{st} year was

(a) ₹ 1000

(b) ₹ 1500

(c) ₹ 1200

(d) None of these

Choose the most appropriate option (a), (b), (c) or (d)

Que 29. At 10% C.I. p.a., a sum of money accumulate to ₹ 9625 in 5 years. The sum invested initially is

(a) ₹ 5976.37

(b) ₹ 5970

(c) ₹ 5975

(d) ₹ 5370.96

Choose the most appropriate option (a), (b), (c) or (d)

Que 30. The population of a country was 55 crores in 2005 and is growing at 2% p.a C.I. the population is the year 2015 is estimated as

(a) 5705

(b) 6005

(c) 6700

(d) None of these