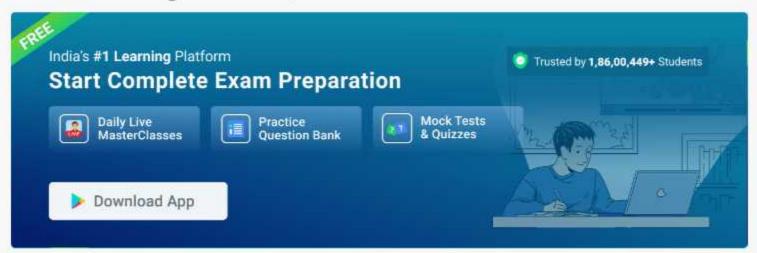
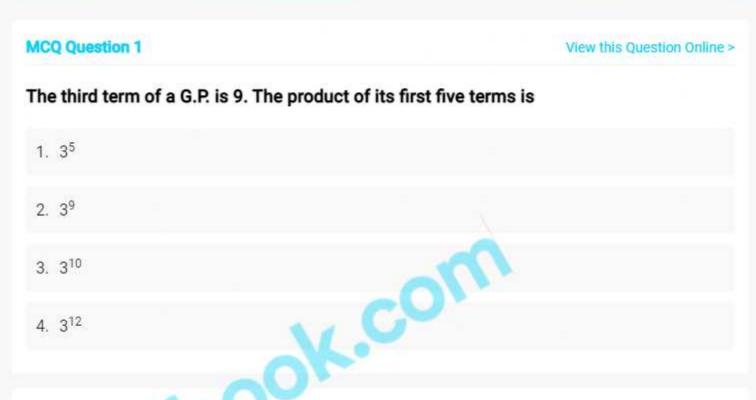
Geometric Progressions Questions





Answer (Detailed Solution Below)

Option 3:310



Let's discuss the concepts related to Sequences and Series and Geometric Progressions. Explore more from Mathematics here. Learn now!

Geometric Progressions MCQ Question 1 Detailed Solution

Concept:

Five terms in a geometric progression:

If a G.P_a has first term a and common ratio r then the five consecutive terms in the GP are of the form $\frac{1}{\Gamma^2}$, $\frac{1}{\Gamma}$,

Calculation:

Let us consider a general geometric progression with common ratio r.

Assume that the five terms in the GP are $\frac{a}{r^2}$, $\frac{a}{r}$, a, ar, ar^2 .

It is given that third term is 9.

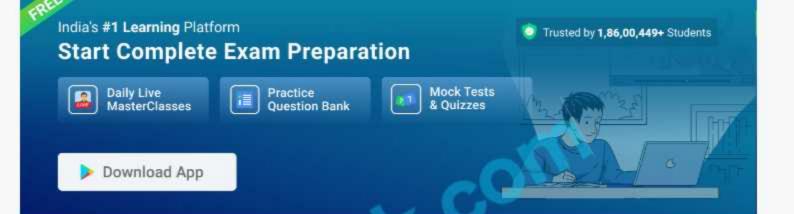
Therefore, a = 9.

Now the product of the five terms is given as follows:

$$rac{a}{r^2} imes rac{a}{r} imes a imes ar imes ar^2 = a^5$$

But we know that a = 9.

Thus, the product is $9^5 = 3^{10}$.



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For what possible value of x are the numbers - 2/7, x, - 7/2 are in a GP?

- 1.
- 2. 1
- 3. Both 1 and 2
- 4. None of these

Answer (Detailed Solution Below)

Option 3: Both 1 and 2

Geometric Progressions MCQ Question 2 Detailed Solution

CONCEPT:

If a, b and c are in a GP then $b^2 = ac$

CALCULATION:

Given: The numbers - 2/7, x, -7/2 are in GP

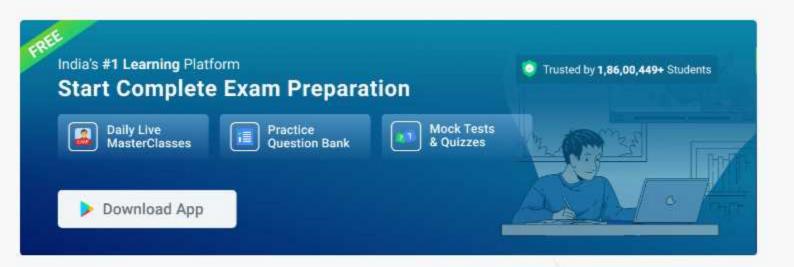
As we know that, if a, b and c are in \mathbb{CP} then \mathbb{b}^2 = ac

Here, a = -2/7, b = x and c = -7/2

$$\Rightarrow$$
 $x^2 = (-2/7) \times (-7/2) = 1$

$$\Rightarrow x = \pm 1$$

Hence, correct option is 3.



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In a G.P. of positive terms, if every term is equal to the sum of next two terms. Then find the common ratio of the G.P.

- 2 sin 18°
- 2 sin 72°
- 4. cos 72°

Answer (Detailed Solution Below)

Option 1: 2 sin 18°

51100011.00 Geometric Progressions MCQ Question 3 Detailed Solution

Concept:

Let us consider sequence a₁, a₂, a₃ a_n is a G.P.

- Common ratio = r = $\frac{a_2}{a_1} = \frac{a_3}{a_2} = \ldots = \frac{a_n}{a_{n-1}}$
- nth term of the G.P. is a_n = arⁿ⁻¹

$$Sin18^{\circ} = \frac{\sqrt{5}-1}{4}$$

Calculation:

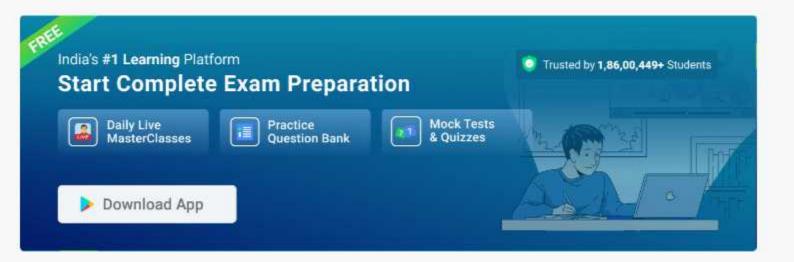
ar, ar².....

Since we have given $a = ar + ar^2$

Now, $1 = r + r^2$

 $\Rightarrow r^2 + r - 1 = 0$

After solving we get $r = \frac{\sqrt{5}-1}{2} = 2 \times \frac{\sqrt{5}-1}{4} = 2 \sin 18^\circ$



MCQ Question 4

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A man has 2 parents, 4 grandparents, 8 great- grand parents, and so on . Find the number of ancestors during the 8 generations preceding his own .

1. 255

2. 450

3. 505

4. 510

Answer (Detailed Solution Below)

Option 4:510

Geometric Progressions MCQ Question 4 Detailed Solution

Concept:

Let us consider sequence a₁, a₂, a₃,..., a_n is an G.P.

- es1100015.000 • Sum of n terms = $s = \frac{a(r^n-1)}{r-1}$; where r > 1
- * Sum of n terms = $s = \frac{a(x-r)}{1-r}$; where r <1

Calculation:

The required no. of ancestors

As we know that sum of G.P.

$$S = \frac{a(r^n-1)}{r-1}$$

Where, a = 2, r = 2 and n = 8

$$\Rightarrow$$
 No. of ancestors required = $\frac{2 \times \left(2^8-1\right)}{2-1}$ = $2 \times \left(2^8-1\right)$ = 510

.. No. of ancestors required is 510.

The correct option is 4.



MCQ Question 5

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If the sum of n numbers in the GP 5, 10, 20, ... is 1275 then n is?

- 1. 6
- 2. 7
- 3. 8

Option 3:8

Geometric Progressions MCQ Question 5 Detailed Solution

Concept:

Let us consider sequence a₁, a₂, a₃ a_n is a G.P.

- Common ratio = r = $\frac{a_2}{a_1} = \frac{a_3}{a_2} = \ldots = \frac{a_n}{a_{n-1}}$

- nth term of the G.P. is $a_n = ar^{n-1}$ Sum of n terms of GP = $s_n = \frac{a(r^n-1)}{r-1}$; where r >1 Sum of n terms of GP = $s_n = \frac{a(1-r^n)}{1-r}$; where r <1 Sum of infinite GP = $s_\infty = \frac{a}{1-r}$; |r| < 1

Calculation:

Given series is 5, 10, 20, ...

Here, a = 5, r = 2

Sum of n numbers = $s_n = 1275$

To Find: nAs we know that, Sum of n terms of GP = $s_n = \frac{a(r^n-1)}{r-1}$; where r > 1

$$\therefore s_n = \frac{5(2^n-1)}{2-1}$$

$$1275 = 5 \times (2^n - 1)$$

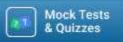
$$\Rightarrow$$
 255 = (2ⁿ - 1)

$$\Rightarrow$$
 2ⁿ = 256

$$\Rightarrow 2^n = 2^8$$

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MCQ Question 6 View this Question Online >

The third term of a GP is 3. What is the product of its first five terms?

- 3. 729
- Cannot be determined due to insufficient data

Answer (Detailed Solution Below)

Option 2:243

esilooka Geometric Progressions MCQ Question 6 Detailed Solution

Concept:

Let us consider sequence a1, a2, a3 an is a G.P.

Common ratio = $r = \frac{a_2}{a_1} = \frac{a_3}{a_2} = \frac{a_n}{a_{n-1}}$

Calculation:

Consider.

(a = 3) be the 3rd term of the G.P series,

So, we can write the five terms as,

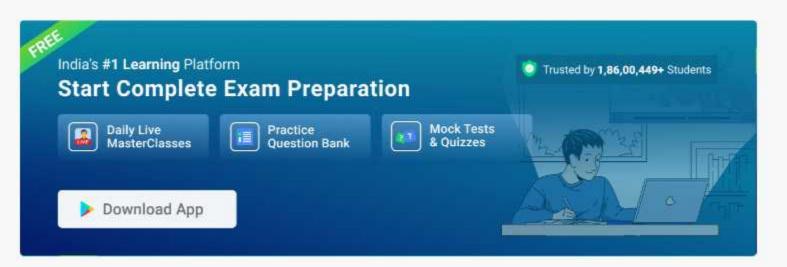
So, the product of the five terms (P) will be,

$$P = \frac{a}{T^2} \times \frac{a}{T} \times a \times ar \times ar^2 = a^5$$

Since,

a = 3,

.. The product of the first five terms (P) = 35 = 243





Answer (Detailed Solution Below)

Option 1:3

Geometric Progressions MCQ Question 7 Detailed Solution

Concept:

Geometric Progression (GP):

- The series of numbers where the ratio of any two consecutive terms is the same is called a Geometric Progression.
- · A Geometric Progression of n terms with first term a and common ratio r is represented as:

- The sum of the first n terms of a GP is: $S_n = a \left(\frac{r^n 1}{r 1} \right)$.
- * The sum to ∞ of a GP, when |r| < 1, is: $S_{\infty} = \frac{1 r}{1 r}$.

Calculation:

Let us consider the infinite series $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots \infty$

Here, a =
$$\frac{1}{3}$$
 and r = $\frac{\frac{1}{9}}{\frac{1}{3}} = \frac{1}{3}$.

$$...\, \varsigma_{\infty} = \frac{a}{1-r} = \frac{\frac{1}{3}}{1-\frac{1}{3}} = \frac{\frac{1}{3}}{\frac{2}{3}} = \frac{1}{2}.$$

Now, let P =
$$9\frac{1}{3}9\frac{1}{9}9\frac{1}{27}...\infty$$

$$\therefore P = 9^{\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots \infty} = 9^{\frac{1}{2}} = \sqrt{9} = 3$$



MCQ Question 8

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For the series $1 + 3 + 3^2 + ...$, the sum to n terms is 3280. Find the value of n.

- 1. 6
- 2. 8
- 3. 10
- 4. 12

Option 2:8

Geometric Progressions MCQ Question 8 Detailed Solution

Concept:

Geometric Progression (GP): The series of numbers where the ratio of any two consecutive terms is the same, is called a Geometric Progression.

A Geometric Progression of n terms with first term a and common ratio r is represented as:

. The sum of the first n terms of a GP is:

$$S_n = a \left(\frac{r^n - 1}{r - 1} \right)$$
.

Calculation:

For the given geometric series $1 + 3 + 3^2 + ...$, we have a = 1 and r = 3.

Let the sum of first n terms be equal to 3280.

$$S_n = 1 \left(\frac{3^n - 1}{3 - 1} \right) = 3280$$

$$\Rightarrow$$
 3ⁿ = 6561 = 3⁸

$$\Rightarrow$$
 n = 8.







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If the sum of n numbers in the GP 4, 8, 16, ... is 2044 then n is?

3. 8

4. 9

Answer (Detailed Solution Below)

Option 4:9

Geometric Progressions MCQ Question 9 Detailed Solution

Concept:

Let us consider sequence a₁, a₂, a₃ a_n is a G.P.

• Common ratio = r = $\frac{a_2}{a_1} = \frac{a_3}{a_2} = \ldots = \frac{a_n}{a_{n-1}}$

• nth term of the G.P. is $a_n = ar^{n-1}$ • Sum of n terms of GP = $s_n = \frac{a(r^n-1)}{r-1}$; where r >1 • Sum of n terms of GP = $s_n = \frac{a(1-r^n)}{r-1}$; where r <1 • Sum of infinite GP = $s_\infty = \frac{a(1-r^n)}{r-1}$; where r <1

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Calculation:

Given series is 4, 8, 16, ...

Here, a = 4, r = 2

Sum of n numbers = $s_n = 2044$

To Find: nAs we know that, Sum of n terms of GP = $s_n = \frac{a(r^n-1)}{r-1}$; where r >1

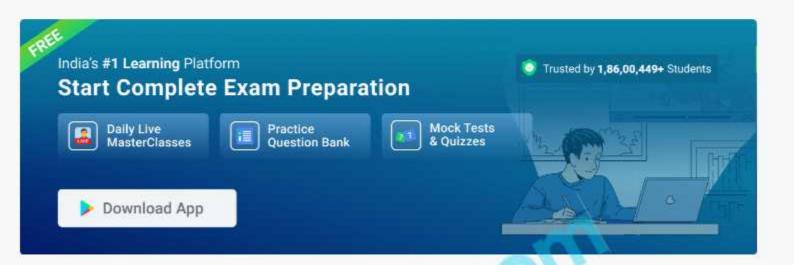
$$\therefore$$
 S_n = $\frac{1}{2-1}$

$$2044 = 4 \times (2^{n} - 1)$$

$$\Rightarrow$$
 511 = (2ⁿ - 1)

$$\Rightarrow$$
 2ⁿ = 512

$$\Rightarrow 2^n = 2^9$$



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What is the nth term of the sequence 25, -125, 625, -3125,?

- 1. (-5)²ⁿ⁻¹
- 2. (-1)²ⁿ⁵ⁿ⁺¹
- 3. (-1)²ⁿ⁻¹5n+1
- 4. (-1)ⁿ⁻¹ 5ⁿ⁺¹

Answer (Detailed Solution Below)

Option 4: (-1)n-1 5n+1

Geometric Progressions MCQ Question 10 Detailed Solution

Concept:

If a_1 , a_2 ,, a_n is a GP then the general term is given by: $a_n = a \times r^{n-1}$ where a is the 1st term and r is

the common ratio.

Calculation:

Given: 25, -125, 625, -3125,

Here, first term a = 25 and common ratio r = -5.

As we know that, if a_1 , a_2 , ..., a_n is a GP then the general term is given by: $a_n = a \times r^{n-1}$ where a is the first term and r is the common ratio.

 \Rightarrow The general term is : $a_n = 25 \times (-5)^{n-1} = (-1)^{n-1} \times 5^{n+1}$