Arithmetic Progression for TCS NQT

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Types of Progression

Arithmetic Progression

- **Finding the nth term**
- **Sum of n terms**
- **Arithmetic Mean**
- **Average of an AP**
- **Finding common difference when two terms are given**

Geometric Progression

- **Finding the nth term**
- **Sum of n terms**
- **Geometric Mean**
- **Finding common difference when two terms are given**

Harmonic Progression

- **Finding the nth term**
- **Sum of n terms**
- **Harmonic Mean**

Relationship among AM GM HM

Arithmetic Progression

Quantities are said to be in arithmetic progression when they increase or decrease by a common difference.

4, 11, 18, 25……..

8, 2, -4, -10……..

$$d = a_{n+1} - a_n$$

a, a + d, a + 2d, a + 2d……

+d +d +d

Finding nth term

$a \quad a + d \quad a + 2d \quad a + 3d$

$a_1 \quad a_2 \quad a_3 \quad a_4$

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

Where,
a = first term
n = number of terms
d = common difference
a_n = n^{th} term

Find 17^{th} term of 3,7,11,15.....

The sum of n terms

$$S_n = \frac{n(a+L)}{2} = \frac{n(2a+(n-1)\,d)}{2}$$

Where ,

a = first term
L = last term
d = common difference
n = number of terms

Find the sum of 16 natural numbers

Arithmetic mean

Say there are 3 numbers in an AP ie a_1, a_2, a_3, Then a_2 is called as the arithmetic mean of a_1 & a_3.

$$A_m = \frac{a+b}{2}$$

Find the arithmetic mean of 13 & 19.

Average of an AP

A.P. = 1, 3, 5, 7, 9, 11

$$\text{Average} = \frac{1+3+5+7+9+11}{6} = \frac{36}{6} = 6$$

Sum of an AP

$S_n = \frac{n(a+L)}{2}$ = n x $\frac{a+L}{2}$ = no of terms x average

Find the common difference when 2 terms are given

Fifth & tenth term of AP is 30 & 90. find the common difference.

1. How Many Times are there in the AP 20, 25, 30 …. 130 ?

a. 22
b. 23
c. 21
d. 24

2. Bobby was appointed to mine works in the pay scale of rupees 7000 -500-12500. find how many years he will take to reach the maximum of the scale ?

a. 11 years
b. 10 years
c. 9 years
d. 8 years

3. Find the first term of an ap whose 8th and 12th terms are respectively 39 and 59 .

a. 3
b. 4
c. 5
d. 6

4. That is an AP 1,3,5….which term of this AP is 55 ?

a. 27^{th}
b. 26^{th}
c. 25^{th}
d. 28^{th}

5. Find the lowest number in an ap such that the number of all the terms is 105 and greatest term is 6 times the least .

a. 5
b. 10
c. 15
d. All of these

6. Find the 15th term of the sequence 20,15,10……

a. -45
b. -55
c. -50
d. 0

7. A sum of money kept in a bank amounts to Rupees 1240 in 4 years and 1600 in 10 years at simple interest find the sum.

a. Rs 800
b. Rs 900
c. Rs 1000
d. Rs 1150

8. A number 15 is divided into three parts which are in AP and the sum of their squares is 83 find the smallest number .

a. 3
b. 5
c. 6
d. 8

9. A number 15 is divided into three parts which are in AP and the sum of their squares is 83 find the smallest number

a. 600
b. 640
c. 680
d. 765

10. How many natural numbers between 300 to 500 are multiples of 7

a. 27
b. 28
c. 29
d. 30

11. Thirteen times the thirteenth term of an AP is equal to seven times the seventh term of the AP. What is the twentieth term ?

a. -1
b. -3
c. 0
d. 4

12. the sum of five terms of an AP is 70 & the product of extreme terms is 132. Find the five terms ?

a. 4,8,12,16,20
b. 10,12,14,16,18
c. 6,10,14,18,22
d. 8,12,16,20,24

Geometric Progression for TCS NQT

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Geometric Progression

Quantities are said to be in geometric progression when they increase or decrease by a common ratio

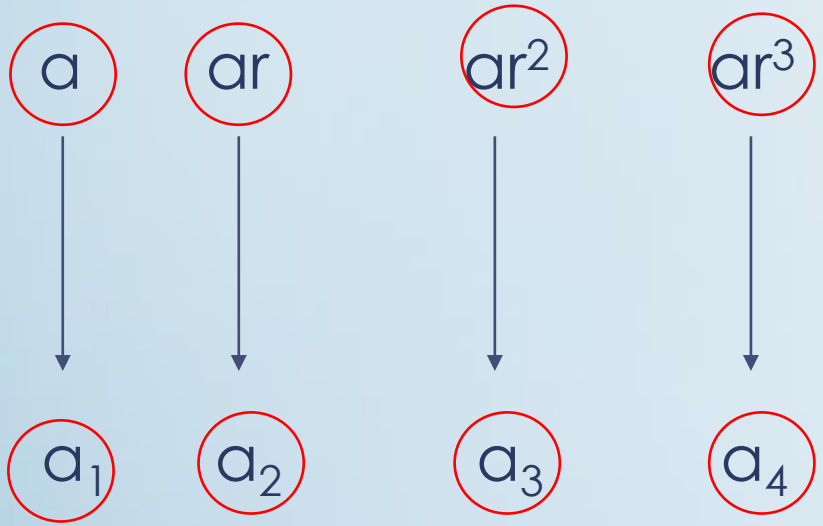
4, 12, 36, 108.....

x3 x3 x3

a ar ar^2 ar^3

$$r = a_{n+1} \div a_n$$

Finding nth term



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

Where,
a = first term
n = number of terms
r = common ratio
a_n = n^{th} term

Find the 7th term of 1,2,4.....

$a = 1$ $r = 2/1 = 4/2 = 2$ $a_n = ar^{n-1}$

$a_7 = ar^6$

$a_7 = 1 \times 2^6 = 64$ **Answer**

Geometric Mean

Say there are 3 numbers in an GP ie a_1, a_2, a_3, Then a_2 is called as the geometic mean of a_1 & a_3.

$a_2/a_1 = a_3/a_2$

$a_2^2 = a_1.a_3$

$a_2 = \sqrt{a_1 \cdot a_3}$

The sum of n terms

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

Where ,

a = first term
r = common ratio
n = number of terms

$$s_\infty = \frac{a}{1 - r}$$

1. Find 9th term of the following series: 5, 10, 20, 40 ……

a. 1024
b. 980
c. 1280
d. 320

2. Ram gives his son Rs. 100 on one day, Rs. 50 on the second day, Rs. 25 on third day and so on. What will be total amount given by Ram to his son starting from the first day, if he lives forever?

a. 200
b. 150
c. 500
d. 350

3. The 3rd and the 8th term of a G. P. are 4 and 128 respectively. Find the G. P

a. 2,3, 4,5
b. 1,2,4,8
c. -12,144,-1728,
d. -1,2,-4,8

4. Which term of the G. P.: 6, –12, 24, – 48, ... is 384?

a. 5
b. 7
c. 8
d. 10

5. The 1st term of a GP is 64 and the 5th term is 4. If the sum of all terms is 128, what is the common ratio?

a. 1/8
b. 2/5
c. 1/2
d. 1/4

6. Find the sum of GP.: 1, 2,4,8, ... up to the 10th term.

a. 2^{10}-1
b. 2^{10}
c. 216
d. $2^{10}/2$

7. Find the sum of an infinite GP 3,1,1/3,..... ?

a. 9

b. 9/2

c. 12

d. 24

8. How many terms of the following G. P.: 64, 32, 16, … has the sum 127 ½ ?

a. 8

b. 5

c. 12

d. 24

Harmonic Progression for TCS NQT

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Harmonic Progression

Harmonic Mean

Relation among AM,GM,HM

1. If the sum of reciprocals of first 11 terms of an HP series is 110, find the 6^{th} term of HP.

a. 1/5
b. 1/10
c. 1/11
d. 1/20

2. Find the 4th and 8th term of the series 6, 4, 3, …

a. 2/5 and 4/3
b. 7/10 and 5/7
c. 1/7 and 3/4
d. 20/11 and 9/8

3. The 2nd term of an HP is 40/9 and the 5th term is 20/3. Find the maximum possible number of terms in H.P.

a. 10
b. 11
c. 9
d. 12