

Quiz:

1) Except for the first two numbers, every number in the sequence -1,3,2,..... is the sum of the two immediately preceding numbers, find the 8th term of the sequence ?

Solution:

Given: -1, 3, 2,.....

$$t_8 = t_7 + t_6$$

$$t_3 = -1 + 3 = 2$$

$$t_4 = 3 + 2 = 5$$

$$t_5 = 2 + 5 = 7$$

$$t_6 = 5 + 7 = 12$$

$$t_7 = 7 + 12 = 19$$

$$t_8 = 12 + 19 = 31$$

$$8^{\text{th}} \text{ term} = 31$$

$$2) \begin{array}{cccc} 64 & x & 192 & -256 \\ 16 & -32 & y & -64 \\ 4 & -8 & 12 & -16 \\ 1 & -2 & 3 & -4 \end{array}$$

In the array of numbers above , each row above is a multiple of 4 of the row below, find (x-y) ?

Solution:

Each row above is a multiple of 4.

$$\text{so, } x = -32 \times 4 = -128 \text{ and } y = 12 \times 4 = 48$$

$$(x - y) = -128 - 48 = -176$$

QUIZ

1) Write down the arithmetic sequence for 8 terms , if the first term is 34 and the common difference is 9 ?

Solution:

$$a = 34 \text{ and } d = 9$$

To find the first 8 terms:

In general AP series can be written as

$$a+0d, a+1d, a+2d, a+3d, \dots, a+nd, \dots$$

So, we need to find the 8 terms.

$$34, 43, 52, 61, 70, 79, 88, 97$$

2) Find the 59th term of the sequence, where the first term is 70 and the common difference is -2 ?

Solution:

$$a = 70 \text{ and } d = -2$$

$$\begin{aligned} t_{59} &= a + (n - 1)d \\ &= 70 + (58)(-2) \\ &= 70 - 116 \\ &= -46 \end{aligned}$$

3) Find the sum of first 10 terms of the Arithmetic sequence 4 , 7 , 10 , 13 ,

Solution:

$$a = 4 \text{ and } d = 7 - 4 = 3$$

$$S_n = n/2 [2a + (n-1)d]$$

$$\begin{aligned} S_{10} &= 10/2 [2(4) + (9) 3] \\ &= 5 [8 + 27] \\ &= 5 [35] \\ &= 175 \end{aligned}$$

4) Find the Sum of first 20 terms of the sequence, where, $l = -45$ and $a = 12$?

Solution:

$$S_n = n/2 (a + l)$$

$$\begin{aligned} S^{20} &= 20/2 (12 - 45) \\ &= 10 (-33) \\ &= -330 \end{aligned}$$

5) Find the sum of first 1000 odd numbers ?

Solution:

The sequence goes as 1, 3, 5, 7, 9,

$$a = 1 \text{ and } l = 1000$$

$$\begin{aligned} S_n &= n/2 [2a + (n-1)d] \\ &= 1000/2 [2 + 999(2)] \\ &= 500 [2 + 1998] \\ &= 500 [2000] \\ &= 100000 \end{aligned}$$

6) Find the 23rd term of an A.P with first term 2 and common difference 7.

Solution:

$$a = 2 \text{ and } d = 7$$

$$\begin{aligned} t_{23} &= a + (n - 1)d \\ &= 2 + (22)7 \\ &= 2 + 154 \\ &= 156 \end{aligned}$$

Quiz:

1) Find the common ratio for the geometric sequence 1, $\frac{1}{2}$, $\frac{1}{4}$,.....

Solution:

first term = 1

Second term = $\frac{1}{2} = a \times r^{(2-1)}$

$\Rightarrow \frac{1}{2} = 1 \times r^{(1)}$

$\Rightarrow r = \frac{1}{2}$

2) Write down the geometric sequence for ten terms, if the first term is 3 and the common ratio is $-\frac{2}{3}$?

Solution:

To find the first 10 terms of GP series.

Given, $a = 3$ and $r = -\frac{2}{3}$

$t_2 = a \times r^{(n-1)}$

$= 3 \times (-\frac{2}{3})$

$= -2$

$t_3 = a \times r^{(n-1)}$

$= 3 \times (-\frac{2}{3})^2$

$= \frac{4}{3}$

$t_4 = a \times r^{(n-1)}$

$= 3 \times (-\frac{2}{3})^3$

$= -\frac{8}{9}$

$t_5 = a \times r^{(n-1)}$

$= 3 \times (-\frac{2}{3})^4$

$= \frac{16}{27}$

$t_6 = a \times r^{(n-1)}$

$= 3 \times (-\frac{2}{3})^5$

$= -\frac{32}{81}$

The sequence is 3, -2, $\frac{4}{3}$, $-\frac{8}{9}$, $\frac{16}{27}$, $-\frac{32}{81}$, $\frac{64}{243}$, $-\frac{128}{729}$, $\frac{256}{2187}$, $-\frac{512}{6561}$

3) Find the 50th term of the geometric progression 5, 10, 20, 40, 80, ...

Solution:

$t_n = a \times r^{n-1}$

given $t_2 = 10$, $a = 5$

$10 = 5 \times r^{2-1}$

$r = \frac{10}{5} = 2$

$t_{50} = 5 \times 2^{50-1}$

$= 5 \times 2^{49}$

$= 2.18415$

4) Find the sum of first 5 terms of the geometric sequence 1, $\frac{2}{3}$, $\frac{4}{9}$,

Solution:

Given $a = 1$

since $t_n = ar^{n-1}$

$r = 2/3$, is less than 1

Therefore $S_n = a \times (1-r^n) / (1-r)$

$$S_5 = 1 \times (1 - 2/3^5) / (1 - 2/3)$$

$$S_5 = 0.8683 / 0.3333 (0.3333)$$

$$S_5 = 2.605$$

5) Find the 20th term of G.P $5/2$, $5/4$, $5/8$,

Solution:

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

$$5/4 = 5/2 \times r^1$$

$$r = 5/4 \times 2/5$$

$$r = 2/4$$

$$t_{20} = 5/2 \times (2/4)^{20-1}$$

$$= 5/2 \times (2/4)^{19}$$

$$= 5/4 \times (2/4)^{18}$$

6) Find the sum of 9 terms of G.P, where $a = 5$ and $r = 4$.

Solution:

$$S_n = a \times (r^n - 1) / (r - 1) \text{ since } r > 1$$

$$S_9 = 5 \times (4^9 - 1) / (4 - 1)$$

$$S_9 = 5 \times (4^8) / 3$$

7) Given a geometric sequence with $a = 729$ and the 7th term is 64, find S_7 ?

Solution:

$$t_7 = ar^{7-1}$$

$$64 = 729 \times r^6$$

$$r^6 = 64/729$$

$$r = 2/3$$

$$S_n = a \times (1 - r^n) / (1 - r) \text{ since } r < 1$$

$$S_7 = 729 \times (1 - (2/3)^7) / (1 - 2/3)$$

$$= 729 \times (1 - (2/3)^7) / (1/3)$$

Guess:

1) Write the first three terms for the sequence $t_n = (n+3)/4$

Solution:

$$t_1 = (1+3)/4,$$

$$t_2 = (2+3)/4,$$

$$t_3 = (3+3)/4$$

$$t_1=1, t_2=5/4, t_3=6/4$$

2) If the 3rd term of G.P (t_3) is 24 and 6th term of G.P (t_6) is 192, find 10th term (t_{10}) .

Solution:

$$\text{Given : } t_3 = 24, t_6 = 192$$

To Find : t_{10}

$$\text{Solution : } t_n = a \times r^{(n-1)}$$

$$\text{Therefore, } t_3 \rightarrow a \times r^{(3-1)} = 24$$

$$\rightarrow a \times r^2 = 24 \text{ -----} > \text{(i)}$$

$$t_6 \rightarrow a \times r^{(6-1)} = 192$$

$$\rightarrow a \times r^5 = 192 \text{ -----} > \text{(ii)}$$

Divide equation (ii) by (i)

$$r^3 = 8, r = 2$$

putting value of r in eq. 1

$$a \times 4 = 24$$

$$a = 6$$

$$t_{10} = 6 \times 2^{10-1}$$

$$= 6 \times 512$$

$$= 3072$$

3) If the 4th term of A.P (t_4) is 30 and 8th term of A.P (t_8) is 42, find 14th term of A.P(t_{14}).

Solution:

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

$$30 = a + 3d \text{ -----} > \text{(i)}$$

$$42 = a + 7d \text{ -----} > \text{(ii)}$$

$$a = 30 - 3d \text{ -----} > \text{(iii)}$$

putting value of a in eq.(ii)

$$30 - 3d + 7d = 42$$

$$4d = 12$$

$$d = 3$$

Putting value in eq. (iii)

$$a = 30 - 9$$

$$= 21$$

$$t_{14} = 21 + 13 \times 3$$

$$t_{14} = 60$$

4) Find the 12th term of A.P, if the 8th term(t_8) is 66 and the common difference (d) is 12 ?

Solution:

$$t_8 = a + 7 \times 12$$

$$a = 66 - 84$$

$$= -18$$

$$t_{12} = -18 + 11 \times 12$$

$$= -18 + 132$$

$$= 114$$

5) Find the 14th term of a G.P. whose 9th term (t_9) is 192 and the common ratio (r) is 2.

Solution:

$$t_n = a \times r^{n-1}$$

$$192 = a \times 2^8$$

$$a = 192/256$$

$$a = .75$$

$$t_{14} = 0.75 \times 2^{13}$$

$$= 6144$$