

NCERT Solutions for Class-XI Maths

Chapter-9 Exercise-9.1 NCERT Math Class 11

1. Write the first five terms of the sequences whose n^{th} term is $a_n = n(n+2)$.

1. $a_n = n(n+2)$

Substituting $n = 1, 2, 3, 4,$ and 5 , we obtain

$$a_1 = 1(1+2) = 3$$

$$a_2 = 2(2+2) = 8$$

$$a_3 = 3(3+2) = 15$$

$$a_4 = 4(4+2) = 24$$

$$a_5 = 5(5+2) = 35$$

Therefore, the required terms are 3, 8, 15, 24, and 35.

2. Write the first five terms of the sequences whose n^{th} term is $a_n = \frac{n}{n+1}$

2. The given n^{th} term of the sequence is $a_n = \frac{n}{n+1}$

The first five terms of the sequence would be given by substituting the value if n as 1, 2, 3, 4, 5

The required terms would be

$$a_1 = \frac{1}{(1+1)} = \frac{1}{2}$$

$$a_2 = \frac{2}{2+1} = \frac{2}{3}$$

$$a_3 = \frac{3}{3+1} = \frac{3}{4}$$

$$a_4 = \frac{4}{4+1} = \frac{4}{5}$$

$$a_5 = \frac{5}{5+1} = \frac{5}{6}$$

3. Write the first five terms of the sequences whose n^{th} term is $a_n = 2^n$

3. $a_n = 2^n$

Substituting $n = 1, 2, 3, 4, 5$, we obtain

$$a_1 = 2^1 = 2$$

$$a_2 = 2^2 = 4$$

$$a_3 = 2^3 = 8$$

$$a_4 = 2^4 = 16$$

$$a_5 = 2^5 = 32$$

Therefore, the required terms are 2, 4, 8, 16, and 32.

4. Write the first five terms of the sequences whose n^{th} term is $a_n = \frac{2n-3}{6}$

4. The n^{th} term of the sequence is given as $a_n = \frac{2n-3}{6}$

The first five terms of the sequence would be obtained by putting the value of n as 1, 2, 3, 4 and 5

$$a_1 = \frac{2(1)-3}{6} = -\frac{1}{6}$$

$$a_2 = \frac{2(2)-3}{6} = \frac{1}{6}$$

$$a_3 = \frac{2(3)-3}{6} = \frac{3}{6} = \frac{1}{2}$$

$$a_4 = \frac{2(4)-3}{6} = \frac{5}{6}$$

$$a_5 = \frac{2(5)-3}{6} = \frac{7}{6}$$

The first five terms of the sequence are $-\frac{1}{6}, \frac{1}{6}, \frac{1}{2}, \frac{5}{6}, \frac{7}{6}$

5. Write the first five terms of the sequences whose n^{th} term is $a_n = (-1)^{n-1} 5^{n+1}$

5. Substituting $n = 1, 2, 3, 4, 5$, we obtain

$$a_1 = (-1)^{1-1} 5^{1+1} = 5^2 = 25$$

$$a_2 = (-1)^{2-1} 5^{2+1} = -5^3 = -125$$

$$a_3 = (-1)^{3-1} 5^{3+1} = 5^4 = 625$$

$$a_4 = (-1)^{4-1} 5^{4+1} = -5^5 = -3125$$

$$a_5 = (-1)^{5-1} 5^{5+1} = 5^6 = 15625$$

Therefore, the required terms are 25, -125, 625, -3125, and 15625.

6. Write the first five terms of the sequences whose n^{th} term is $a_n = n \frac{n^2 + 5}{4}$

6. The n^{th} term of the given sequence is

$$a_n = n \frac{n^2 + 5}{4}$$

The first five terms of the sequence would be given by putting the value of n as 1, 2, 3, 4 and 5

$$a_1 = 1 \left(\frac{1+5}{4} \right) = \frac{3}{2}$$

$$a_2 = 2 \frac{(4+5)}{4} = \frac{9}{2}$$

$$a_3 = 3 \frac{9+5}{4} = \frac{21}{2}$$

$$a_4 = 4 \frac{16+5}{4} = 21$$

$$a_5 = 5 \frac{25+5}{4} = \frac{75}{2} \text{ The first five terms of the sequence are } \frac{3}{2}, \frac{9}{2}, \frac{21}{2}, 21, \frac{75}{2}$$

7. Find the 17th term in the following sequence whose n^{th} term is

$$a_n = 4n - 3; a_{17}, a_{24}$$

7. Substituting $n = 17$, we obtain

$$a_{17} = 4(17) - 3 = 68 - 3 = 65$$

Substituting $n = 24$, we obtain

$$a_{24} = 4(24) - 3 = 96 - 3 = 93$$

8. Find the 7th term in the following sequence whose n^{th} term is $a_n = \frac{n^2}{2^n}; a_7$

8. The given n^{th} term of the sequence is

$$a_n = \frac{n^2}{2^n} \dots\dots\dots 1$$

We have to find out a_7 , so putting value of $n = 7$ in given expression 1

$$a_7 = \frac{7^2}{2^7} = \frac{49}{128}$$

9. Find the 9th term in the following sequence whose n^{th} term is $a_n = (-1)^{n-1} n^3; a_9$

9. Substituting $n = 9$, we obtain

$$a_9 = (-1)^{9-1} (9)^3 = (9)^3 = 729$$

10. Find the 20th term in the following sequence whose n^{th} term is $a_n = \frac{n(n-2)}{n+3}; a_{20}$

10. In the given expression the value of n^{th} term is

$$a_n = \frac{n(n-2)}{n+3}$$

We have to find out value of a_{20} , putting the value of $n = 20$ in given expression

$$a_{20} = \frac{20(20-2)}{23} = \frac{20(18)}{23} = \frac{360}{23}$$

11. Write the first five terms of the following sequence and obtain the corresponding series:

$$a_1 = 3, a_n = 3a_{n-1} + 2 \text{ for all } n > 1$$

11. $a_1 = 3, a_n = 3a_{n-1} + 2$ for all $n > 1$

$$\Rightarrow a_2 = 3a_1 + 2 = 3(3) + 2 = 11$$

$$a_3 = 3a_2 + 2 = 3(11) + 2 = 35$$

$$a_4 = 3a_3 + 2 = 3(35) + 2 = 107$$

$$a_5 = 3a_4 + 2 = 3(107) + 2 = 323$$

Hence, the first five terms of the sequence are 3, 11, 35, 107, and 323. The corresponding series is $3 + 11 + 35 + 107 + 323 + \dots$

12. Write the first five terms of the following sequence and obtain the corresponding series:

$$a_1 = -1, a_n = \frac{a_{n-1}}{n}, n \geq 2$$

12. Here given $a_1 = -1$ and

$$a_n = \frac{a_{n-1}}{n} \dots\dots\dots 1$$

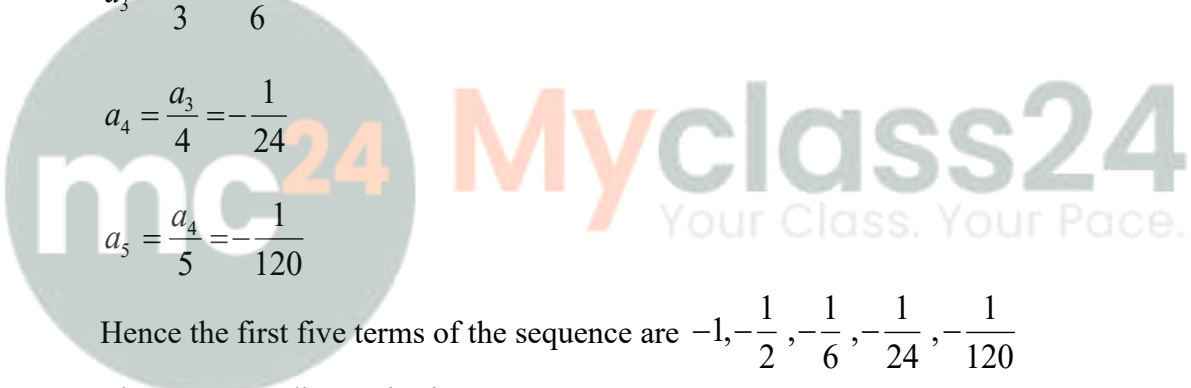
To find out the first five terms of the sequence we will put $n = 2, 3, 4, 5$ in the expression 1

$$a_2 = \frac{a_1}{2} = -\frac{1}{2}$$

$$a_3 = \frac{a_2}{3} = -\frac{1}{6}$$

$$a_4 = \frac{a_3}{4} = -\frac{1}{24}$$

$$a_5 = \frac{a_4}{5} = -\frac{1}{120}$$



Hence the first five terms of the sequence are $-1, -\frac{1}{2}, -\frac{1}{6}, -\frac{1}{24}, -\frac{1}{120}$

The corresponding series is

$$(-1) + \left(-\frac{1}{2}\right) + \left(-\frac{1}{6}\right) + \left(-\frac{1}{24}\right) + \left(-\frac{1}{120}\right) + \dots\dots$$

13. Write the first five terms of the following sequence and obtain the corresponding series:

$$a_1 = a_2 = 2, a_n = a_{n-1} - 1, n > 2$$

13. $a_1 = a_2 = 2, a_n = a_{n-1} - 1, n > 2$

$$\Rightarrow a_3 = a_2 - 1 = 2 - 1 = 1$$

$$a_4 = a_3 - 1 = 1 - 1 = 0$$

$$a_5 = a_4 - 1 = 0 - 1 = -1$$

Hence, the first five terms of the sequence are 2, 2, 1, 0, and -1.

The corresponding series is $2 + 2 + 1 + 0 + (-1) + \dots$

14. The Fibonacci sequence is defined by
 $1 = a_1 = a_2$ and $a_n = a_{n-1} + a_{n-2}$, $n > 2$.

Find $\frac{a_{n+1}}{a_n}$, for $n = 1, 2, 3, 4, 5$

14. Here given $a_1 = a_2 = 1$

And $a_n = a_{n-1} + a_{n-2}$, $n > 2$.

$$a_3 = a_2 + a_1 = 1 + 1 = 2$$

$$a_4 = a_3 + a_2 = 2 + 1 = 3$$

$$a_5 = a_4 + a_3 = 3 + 2 = 5$$

$$a_6 = a_5 + a_4 = 5 + 3 = 8$$

Now putting the value of $n = 1, 2, 3, 4, 5$ in $\frac{a_{n+1}}{a_n}$

$$\text{For } n=1, \frac{a_{n+1}}{a_n} = \frac{a_2}{a_1} = \frac{1}{1} = 1$$

$$n=2, \frac{a_{n+1}}{a_n} = \frac{a_3}{a_2} = \frac{2}{1} = 2$$

$$n=3, \frac{a_{n+1}}{a_n} = \frac{a_4}{a_3} = \frac{3}{2}$$

$$n=4, \frac{a_{n+1}}{a_n} = \frac{a_5}{a_4} = \frac{5}{3}$$

$$n=5, \frac{a_{n+1}}{a_n} = \frac{a_6}{a_5} = \frac{8}{5}$$

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