10.1 Part 2

Wednesday, March 3, 2021 2:21 PM

Exp Find the n^{th} term of the following sequences:

a_n

$1, -4, 9, -16, 25, \ldots$?? $(-1)^{n+1} n^2$

1st term, 2nd term, 3rd term, n^{th} term

$n=1$, $n=2$, $n=3$, $n=4$

$a_n = (-1)^{n+1} n^2$, $n = 1, 2, 3, \ldots$

$(-1)^n$ $(-1)^{n+1}$

$n=1 \Rightarrow a_1 = (-1)^2 (1)^2 = 1$

$n=2 \Rightarrow a_2 = (-1)^3 (2)^2 = (-1)(4) = -4$

$a_n = (-1)^n (n+1)^2$, $n = 0, 1, 2, 3, \ldots$

$n=0 \Rightarrow a_0 = (-1)^0 (1)^2 = 1$

$n=1 \Rightarrow a_1 = (-1)^1 (2)^2 = (-1)(4) = -4$ ----

$2, 0, 3, 8, 15, 24, \ldots$?? a_n

$a_n = n^2 - 1$, $n = 1, 2, 3, \ldots$

$0 - 1 = -1$ ✗

$n = 1 \Rightarrow 0$, $n = 2 \Rightarrow 3$, $n = 3 \Rightarrow 8$

$0 - 1 = (-1)$ ✗ $0 \quad 3 \quad 8$

(3) $-3, -2, -1, 0, 1, \ldots$

(الأول، الثاني، الثالث، الرابع، الخامس)

$a_n = ??$

$n = 1, 2, 3, 4, \ldots$ (الأول، الثاني، الثالث)

✓ $a_n = \boxed{n - 4}$

$a_{100} = 100 - 4 = 96$

✓ $a_n = n - 3 , \quad n = 0, 1, 2, 3$ (الأول، الثاني) ✓

$a_n = n - 2 , \quad n = -1, 0, 1, 2, \ldots$ ✓

Recursive Sequence :

$a_{100} \to a_{99} \to a_{98} \ldots$

a_n → من أجل إيجاد أي حد

$a_{100} = \ldots$

$a_{1000} = \ldots$

Exp $a_1 = 1 , \quad a_{n+1} = \frac{1}{2} a_n$ ✓

Assume this sequence converges, find it's limit. Find $\lim_{n \to \infty} a_n$

$a_1 = 1 = \left(\frac{1}{2}\right)^0$

$a_2 = a_{1+1} = \frac{1}{2} a_1 = \frac{1}{2}(1) = \left(\frac{1}{2}\right)^1$

$a_3 = a_{2+1} = \frac{1}{2} a_2 = \frac{1}{2} \frac{1}{2} = \left(\frac{1}{2}\right)^2$

$a_4 = a_{3+1} = \frac{1}{2} a_3 = \frac{1}{2}\left(\frac{1}{2}\right)^2 = \left(\frac{1}{2}\right)^3$

$-1 < x = \frac{1}{2} < +1$

$a_{(4)} = \overset{u}{(2)} + 1 = \frac{1}{2}(3) - - -$

$a_5 = \left(\frac{1}{2}\right)^4$

$a_n = \left(\frac{1}{2}\right)^{n-1}$

$\Rightarrow \lim_{n\to\infty} a_n = \lim_{n\to\infty} \left(\frac{1}{2}\right)^{n-1} = \left(\frac{1}{2}\right)^{-1} \lim_{n\to\infty} \left(\frac{1}{2}\right)^{n} \to 0$

$= 2(0)$

$= 0$