

Answer on Question #54897 – Math – Calculus

Determine whether the sequence converges or diverges.

If it converges, find the limit:

1. $a(n) = (n^3)/(n+1)$
2. $a(n) = \sqrt{(n+1)/(9n+1)}$
3. $a(n) = ((-1)^{(n+1).n})/(n+\sqrt{n})$
4. $a(n) = \cos(n/2)$

Solution

1. $a_n = \frac{n^3}{n+1}$, $\lim_{n \rightarrow \infty} \frac{n^3}{n+1} = \infty$. Sequence diverges.

2. $a_n = \sqrt{\frac{n+1}{9n+1}}$, $\lim_{n \rightarrow \infty} \sqrt{\frac{n+1}{9n+1}} = \frac{1}{3}$. Sequence converges to $\frac{1}{3}$.

3. $a_n = \frac{(-1)^{n+1}n}{n+\sqrt{n}}$, $\lim_{n \rightarrow \infty} \frac{(-1)^{n+1}n}{n+\sqrt{n}} - DNE$ (the limit does not exist).

Sequence diverges.

4. $a_n = \cos \frac{n}{2}$, $\lim_{n \rightarrow \infty} \cos \frac{n}{2} - DNE$ (the limit does not exist).

Sequence diverges.