

To be handed in nice and neat:

1. Let $a_n = \frac{n}{2n-1}$ List the first 5 terms, then compute $\lim_{n \rightarrow \infty} a_n$

2. Show $\lim_{n \rightarrow \infty} \frac{\cos(n)}{\sqrt{n}} = 0$

3. Determine if $a_n = \frac{n}{n^2+1}$ is monotonic increasing or decreasing. Give an upper and lower bound.

4. For the sequence defined by $a_1 = 2, a_{n+1} = \frac{1}{3-a_n}$

(a) List the first 5 terms.

(b) The sequence is decreasing and bounded below by 0. Explain in clear English (briefly) why this means it must have a limit.

(c) Find the limit.

5. For the Fibonacci sequence

$$f_1 = f_2 = 1, f_n = f_{n-1} + f_{n-2}$$

$$\text{let } a_n = \frac{f_{n+1}}{f_n}$$

(a) List the first 5 terms of a_n

(b) Assuming the limit exists, find $\lim_{n \rightarrow \infty} a_n$