

MA 103
Board Problems
Lesson 40 & 41

I. Determine the limit of the following functions if it exists. If it does not, state why.

1. $\lim_{t \rightarrow \infty} \frac{t - 2}{3t + 4}$
2. $\lim_{x \rightarrow \infty} \frac{x^2 + 2}{x^3 - x - 1}$
3. $\lim_{t \rightarrow \infty} \frac{t^4 - 2}{3t + 4}$
4. $\lim_{a \rightarrow \infty} e^{-a}$
5. $\lim_{x \rightarrow \infty} \sin x + 1$

II. Determine the limit of the following recursion equations if it exists. If it does not, state why.

Find the equilibrium point(s) of each.

1. $a_{n+1} = 4 - a_n, \quad a_1 = 1$
2. $a_n = \sqrt{2 + a_{n-1}}, \quad a_1 = \sqrt{2}$
3. $a_{n+1} = 3 - \frac{1}{a_n}, \quad a_1 = 1$
4. $a_n = \frac{1}{3 - a_{n-1}}, \quad a_1 = 2$
5. $a_n = \frac{1}{1 + a_{n-1}}, \quad a_1 = 1$
6. $a_n = 1 + \frac{1}{1 + a_{n-1}}, \quad a_1 = 1$