



Problem 1. [3 points] What is the domain of the function $f(x) = \arctan(\log(3x+5))$? Is f surjective? And injective? If so, find its inverse.

Problem 2. [3 points] Study the convergence of the following sequence, and find its limit if it exists:

$$a_{n+1} = \frac{1}{5} (a_n^2 + 6), \quad a_1 = \frac{3}{2}.$$

Problem 3. [4 points] Study the convergence of the following series of real numbers:

a) [2 points]

$$\sum_{n=1}^{\infty} \frac{n^3 + 2\sqrt{n}}{\sqrt{n^7 + 3}}$$

b) [2 points]

$$\sum_{n=1}^{\infty} \left(\frac{n^2 + n}{e^n} \right)^n$$
