Third Partial for MATE-1214 Cálculo Integral con Ecuaciones Diferenciales

08/11/2018

Name:
Surname:
Student Code:

1. Evaluate
$$\lim_{n \to \infty} \frac{\cos(n)}{n}.$$

2. Determine whether the following series converges or diverges. If it converges, evaluate the sum.
$$\sum_{n=1}^{\infty} \frac{2}{n(n+1)}.$$

3. Determine whether the following series converges or diverges. If it converges, evaluate the sum.
$$\sum_{n=0}^{\infty} \frac{n^2 + 2n + 2}{\sqrt{n^6 + 3n^2 + 1}}.$$

4. Find the interval of convergence of the following power series.
$$\sum_{n=2}^{\infty} \frac{(-1)^n (x-1)^n}{\ln n \cdot 2^n}.$$

5. Expand in power series around $x = 1$ the function
$$\frac{1}{x^2}.$$