NAME AND SURNAME	INDEX NUMBER	GROUP

TEST I *November 18th*

Ex 1. *(2 pts.)* Using the sequence of partial sums S_n establish if the series $\sum_{n=1}^{\infty} \cos(n\pi)$ converges or diverges.

Ex 2. *(1 pt.)* a) Give a definition of a comparison test.

(2 pts.) b) Find if the series $\sum_{n=1}^{\infty} \frac{n+1}{2n^2-1}$ diverges or converges using any appropriate method.

Ex 3. *(3 pts.)* Establish the type of convergence (divergent, absolutely convergent, conditionally convergent) of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{\sqrt[3]{n^4+1}}$. *(Justify each condition of the alternating series test using at least one sentence).*

Ex 4. *(2 pts.)* a) Calculate the limit $\lim_{(x,y)\to(0,0)} \frac{x^2y^2}{x^2+y^2}$.

(2 pts.) b) Show that the limit $\lim_{(x,y)\to(0,0)} \frac{xy}{x^2+y^2}$ does not exist using any method you wish.

Ex 5. *(2 pts.)* Find all first and second derivatives of $f(x,y) = \frac{x}{y} + \frac{y}{x}$.

Ex 6. *(4 pts.)* Find all extreme values of $f(x,y) = \frac{1}{5x} + \frac{5}{y} - xy$.

Ex 7. *(2 pts.)* Calculate the approximated value and all errors of $\sqrt{(3.2)^2 + (3.9)^2}$.

Bonus *(2 pts.)* Give an equation of a plane Π that is tangent to $f(x,y) = \ln(2x+y)$ at $P = (-1,3,0)$.