NAME AND SURNAME	INDEX NUMBER	GROUP

TEST I *November 28th*

Ex 1. *(3 pts.)* Using the sequence of partial sums S_n establish if the series $\sum_{n=1}^{\infty} \frac{1-n}{n!}$ is convergent or divergent.

Ex 2. *(1 pts.)* Apply the necessary condition for convergence to the series $\sum_{n=1}^{\infty} \sqrt[n]{\frac{n}{3}}$.

Ex 3. *(2+1 pts.)* Establish the convergence of the series $\sum_{n=1}^{\infty} \tan^n(\frac{\pi n^2+1}{3n^2+1})$ using an appropriate test.

b) Write the name and the definition of the test you used in Exercise 3a.

Ex 4. *(3 pts.)* Establish if the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{3^n+2}$ is divergent, conditionally convergent or absolutely convergent. Justify each condition of the alternating series with at least one sentence.

Ex 5. *(1 pts.)* Calculate the limit $\lim\limits_{(x,y)\to(1,3)} \frac{\sin(3x-y)}{3x^2-xy}$.

Ex 6. *(4 pts.)* Find all extremes and saddle points of $f(x,y) = x^2 + 2y^2 - 2xy - 4x$.

Ex 7. *(2 pts.)* Calculate the approximated value of $1.96 \cdot e^{0.03}$ and find both errors knowing that $V_C = 2.01969$.

Ex 8. *(3×1 pt.)* a) Calculate f'_{xxyzy} if $f(x,y,z) = 2x^2y^3 \ln z - z \cdot \sin y$.

b) Describe the procedure of changing Carthesian coordinates (x,y) to polar coordinates (r,ϕ). Draw a diagram.

c) Calculate the limit $\lim\limits_{(x,y)\to(0,0)} \frac{2xy+x^2+y^2}{x^2-y^2}$ or show that it doesn't exist.