**Mathematics in Economics**

**Written Exam – Part 1 – 30 points**

Name: …………………………………

1) Find the derivatives:

1. $y=x^{5}+4x^{3}-5x+sinx$
2. $y=\frac{3x+5}{lnx}$
3. $y=ln\left(x^{3}+2x+1\right)$ 6 points

2) Find the domain of the function of two variables:

$f\left(x,y\right)=ln\left(x-y+3\right)$ 6 points

3) Find Taylor series of $ f\left(x\right)=4x^{3}+2x^{2}-5x+1$ at the point *a* = 2. 6 points

4) Find maxima/minima of the function: $y=x^{3}-12x+4.$ 6 points

5) Find the increment (find total differential) of the function $f\left(x,y\right)=3xy+2x^{2}-3y^{2}$ for *x* = 1, *y* = 2, *dx* = 0.1 and *dy* = 0.2.

 6 points