

Test of Mathematics

June 30, 2014

Name:.....Surname:.....

Matriculation number:.....

1. How many numbers are there of 4 digits (from 1000 to 9999) with two even digits in increasing order and two odd digits in increasing order (example: 2347)?
2. Determine the domain of the following real-valued function:

$$y = f(x) = \log(\arcsin(x^2 - 1)).$$

3. Determine the following limit:

$$\lim_{x \rightarrow 0} \frac{e^{\sin^2 x} - 1}{1 - \cos^2 x}.$$

4. Study the following function and draw its graph (just consider the first derivative):

$$f(x) = x^2 \log x.$$

5. Determine the following indefinite integral:

$$\int x^2 e^x dx.$$

6. Determine the derivatives $f'_x(x, y)$ and $f'_y(x, y)$ of the following real-valued function of two real variables:

$$z = f(x, y) = x\sqrt{xy}.$$