Test of Mathematics

May 11, 2016

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

Matriculation number:.....

1. Determine the domain of the following function:

$$f(x) = \sqrt{log \mid x \mid -1}$$

2. Consider the real-valued function defined as follows:

$$y = f(x) = arcsin(x^3 - 1).$$

Determine the inverse function $x = f^{-1}(y)$.

3. Determine the following limit:

$$\lim_{x \to 0} \frac{log(1 + x^2)}{1 - cos^2 x}.$$

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

$$f(x) = log\left(\frac{x}{1 + x^2}\right).$$

Determine the point(s) at which the function is equal to zero.

5. Determine the following indefinite integral:

$$\int cos\, x\ sin(cos\, x)\ dx.$$

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

$$z = f(x, y) = arcsin(x - y).$$