Test of Mathematics

May 25th, 2015

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

Matriculation number:.........................

1. Determine the domain of the function

$$f(x) = arcsin\left(\frac{1-x}{x}\right).$$

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

$$y = f(x) = arctang(\sqrt[3]{x}).$$

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

3. Determine the following limit:

$$\lim_{x \to 1} \frac{log\, x}{arctang^2(x-1) + sin(x-1)}.$$

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

$$f(x) = e^{\frac{1}{1-x}}.$$

5. Determine the following indefinite integral:

$$\int \frac{tang\,\sqrt{x}}{\sqrt{x}}\, dx.$$

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

$$z = f(x,y) = arcsin(xy^2).$$