

Test of Mathematics

June 28, 2016

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

Matriculation number:.....

1. Determine the domain of the following function:

$$f(x) = \log(1 - \log x).$$

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

$$y = f(x) = \arcsin(1 - \sqrt{x}).$$

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

3. Determine the following limit:

$$\lim_{x \rightarrow 0} \frac{\sin(\sin x)}{\log(x + 1)}.$$

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

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

5. Determine the following indefinite integral:

$$\int \frac{\cos\sqrt{x}}{\sqrt{x}} dx.$$

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

$$z = f(x, y) = \sqrt{x - y^2}.$$