Test of Mathematics

February 9, 2016

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

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

1. Solve the inequality

$$\sqrt{x-1} \geq x - 2.$$

2. Determine the domain of the following function:

$$f(x) = arcsin(x^2 - 2x).$$

3. Determine the following limit:

$$\lim_{x \to 1^+} \frac{\sqrt{log\, x}}{sin\,\sqrt{x-1}}.$$

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

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

5. Determine the following indefinite integral:

$$\int \frac{log(\sqrt{x}+1)}{\sqrt{x}}\, dx.$$

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

$$z = f(x, y) = e^{log\, x - xy}.$$