MATH 101 QUIZ 1

Student ID:
Name:

1. Evaluate the limit
$$\lim_{x \to 0} \left(\frac{1 - \sqrt{1+x}}{x\sqrt{1+x}} \right).$$

2. Find the constant a so that the function
$$f(x) = \begin{cases} ax^2 + 2 & \text{if } x \leq 1 \\ 2\sqrt{3x+1} & \text{if } x > 1 \end{cases}$$
has a limit as x tends to 1.

3. Find a suitable $\delta > 0$ such that $|f(x) - 5| < 0.5$ whenever $0 < |x - 2| < \delta$, where $f(x) = 2x + 1$.

4. Prove that $\lim_{x \to 0} \sqrt{x}\, e^{\sin \frac{\pi}{x}} = 0$.