

MATH 111

Quiz 2

December 2001

1. Show that for any $\varepsilon \in \mathbb{Q}^{>0}$, there exists a natural number n such that $\frac{1}{10^{n-1}} < \varepsilon$.
2. Calculate the number of injective functions from a set with n elements to a set with m elements.
3. Let $(a_n)_{n \in \mathbb{N}}$ be a Cauchy sequence. Show that $(a_n^2)_{n \in \mathbb{N}}$ is a Cauchy sequence too.
4. Find a sequence $(a_n)_{n \in \mathbb{N}}$ which is not Cauchy but $(a_n^2)_{n \in \mathbb{N}}$ is Cauchy.