Fall 2005 PMAT 435 L01 term-test 9:00. 07.11.2005.

time: 50 minutes

ID NUMBER:

NO CALCULATORS

Do not put your name on this page

Name:	ID:

Problem 1: [56 pts] Define:

1. The sequence $\{a_n\}$ converges to the real number A.

2. The set $E \subseteq \mathbb{R}$ is open.

3. The sequence $\{a_n\}$ is eventually constant.

4. The sequence $\{a_n\}$ is a Cauchy sequence.

5. The function $f : D \to \mathbb{R}$ is uniformly continuous.

6. Accumulation point of a subset of $\mathbb{R}$.

7. The function f has limit L as x tends to $a \in \mathbb{R}$.

8. The function f is continuous at $a \in \mathbb{R}$.

Name:	ID:

Problem 2: [54 pts]

1. Define the function $\exp(x)$.

2. Prove that $\lim_{x\to 0} \exp(x) = 1$.

3. Prove that the function $\exp(x)$ is continuous.

Name:	ID:

Problem 3: [55 pts] Let D be a closed and bounded set. Prove: If $f : D \to \mathbb{R}$ is continuous then f is uniformly continuous.

Name:	ID:

Problem 4: [55 pts] Prove: If a function f is continuous on $[a, b]$ and if $f(a) < k < f(b)$ then there exists a real number $c \in (a, b)$ such that $f(x) = k$.