Computer Science Department
Stanford University
Comprehensive Examination in Numerical Analysis
Autumn 1999

November 3, 1999

READ THIS FIRST!

1.   You should write your answers for this part of the Comprehensive Examination in a
     BLUE BOOK. Be sure to write your MAGIC NUMBER on the cover of every blue book
     that you use.

2.   This exam is CLOSED BOOK. You may not use notes, articles, or books.

1. (15 pts.) Give a direct proof that Euler's method is a convergent algorithm for the initial vaue problem $y' = ay$, $y(0)$ given, for $0 \leq t \leq T$. By direct it is meant that no theorems are to be used.

2. (15 pts.) Use the error formula for polynomial interpolation to construct an error formula for the trapezoidal rule approximating the integral of $f(x)$ from $x=a$ to $x=b$. This is for the basic trapezoidal rule, NOT the composite trapezoidal rule.