

NUMERICAL ANALYSIS

Comprehensive Examination

1996-1997

closed book

1. (15 points) Show that Newton's method for a solution x of $f(x) = 0$ for a nonlinear scalar real valued function converges quadratically under certain stated assumptions on f .
2. (15 points) Derive an expression for the error in polynomial interpolation of a sufficiently smooth real valued function $f(x)$ by a polynomial of degree n . State conditions on f needed to obtain the result. Assume that the error $e(x)$ has the form $e(x) = c(x)(x-x_0) \cdots (x-x_n)$ where the x_j are the interpolation points and compute $c(x)$.