

AMSC/CMSC 460 Quiz 7 , Fall 2002

Show all work. You may leave arithmetic expressions in any form that a calculator could evaluate. By putting your name on this paper, you agree to abide by the university's code of academic integrity in completing the quiz. Use no books, calculators, cellphones, communication with others, scratchpaper, etc.

Name \_\_\_\_\_

Student number \_\_\_\_\_

1. (10) Let

$$f(x) = x^2 - 4.$$

Suppose our guess at the zero of this nonlinear equation is 1.5. If we apply Newton's method, what would the next guess be?

2. (10) Suppose we solve a linear system  $Ax = b$  using Matlab's backslash command

$$x = A \setminus b.$$

We compute

$$r = b - Ax$$

and find that

$$\|r\|_1 = 5 \times 10^{-9}$$

and the condition number of  $A$  (in the 1-norm) is 6000. Give a bound on

$$\frac{\|x_{true} - x\|_1}{\|x_{true}\|_1}$$

in terms of  $A$  and  $b$ .