

AMSC/CMSC 460 Quiz 1 , 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 _____

For this page of the quiz, assume you have a base 2 computer that stores floating point numbers using a 5 bit normalized mantissa (x.xxxx), a 4 bit exponent, and a sign for each. Assume that all numbers are chopped rather than rounded.

1a. (5) Give the machine representation and a base 10 representation for machine epsilon, the smallest nonzero positive number which, added to 1, gives a number different from 1.

1b. (5) Which machine number is closest to π ?

2. (5) Suppose I have measured the sides of a rectangle as $3.2 \pm .005$ and $4.5 \pm .005$. Give a bound on the relative error in $A = 3.2 * 4.5$ as an approximation to the area of the rectangle.

3. (5) Define backward error analysis.