

MIDTERM EXAM I: CS321-002, Fall 2001

11:00pm, September 27, 2001

This is a closed book test. Please show all steps in your work. Please finish your work independently.

1. (10 points) Convert $(532.270)_{10}$ to a binary number. For the fractional part, only the first 6 digits after the radix point are needed.
2. (10 points) Design an algorithm to compute the values of

$$f(x) = \sqrt{x + 16} - 4$$

accurately when x is small.

3. (10 points) Use the Newton's method to find a root of the function

$$f(x) = x^3 + x^2 - 5$$

with $x_0 = 1$ as the initial guess and carrying out the first two steps, i.e., you need to compute x_2 .

4. (10 points) Find the interpolating polynomial of order less than or equal to 2 for the following table

x	3	6	8
y	1	10	20

Please verify the correctness of your interpolating polynomial.

5. (10 points) Two numbers x and y that are not machine numbers are read into a single precision machine. The machine then computes xy . What sort of relative error can be expected?

Please remember to write down your name on the answer sheets.