## MACM 316 (Fall, 2006) Date: September 13, 2006 Date due: 5pm, Friday, September 22, 2006

## Please submit your answers, stapled together with your name and student id, in the assignment box marked MACM 316.

- 1. Problems from the text (section 1.2): 2(a), 2(c); 6; 10(a) using any programming language; 12.
- 2. Suppose in IEEE single precision, the exponent field has 4 bits, instead of 8, and the significand is stored using 5 bits. The numbers are normalized, i.e. any floating point number has the form  $(-1)^s m \cdot 2^E$  where  $1 \leq m < 2$ .
  - (a) What is the exponent bias?
  - (b) What are the largest and the smallest nonnegative normalized floating point number in this system?
  - (c) What is the machine epsilon of this system?
  - (d) Give a real number which does not have a floating point representation in this system. What are its two closest floating point numbers?
  - (e) Round  $(11.011011)_2$  and  $-(11.011011)_2$  to floating point numbers in this system using the round to nearest mode.