1. Write down the range of integers represented in each of the following 7-bit representations:

(a) sign and magnitude

(b) ones complement

(c) twos complement

2. Use Booths Algorithm to perform the multiplication 000111(7) x 111011(-5).

3. Assume an 8-bit floating point representation: sign bit followed by 3-bit biased exponent followed by a 4-bit normalized significand.

(a) What is the representation of -2/3?

(b) What is the error in the representation of -2/3?

(c) Use floating point addition to compute

1000.0 + (0.0101 + 0 .0011) and (1000.0 + 0.0101) + 0.0011

Comment on the results.

4. In which of the following addition problems (using 4-bit two’s complement notation) does an

overflow error occur?

A. 0 0 1 1 B. 0 1 0 0 C. 1 1 0 0

+ 1 0 1 0 + 0 1 0 0 + 1 1 0 0

5. Use the 11-bit floating-point format in which the most significant bit is the sign bit, the next four bits represent the 4-bit biased exponent field, and the last six bits represent the normalized significand to answer the following questions:

a. What decimal value is represented by the bit pattern 1 1 0 1 1 1 0 011 0?

b. Determine the ranges of numbers represented.

c. Give an example of a decimal number that is represented accurately.

d. Give an example of a decimal number that cannot be represented accurately.

e. Give an example showing addition of numbers represented in the 11-bit floating point format is not associative.

6. Assume a 10-bit floating point format in which the most significant bit is the sign bit, the next four bits represent the 4-bit biased exponent field, and the last five bits represent the normalized significand with implied bit.

What is the decimal result of adding 13 to 128 in the 10-bit floating point system?