Name: ____________________

Directions: **Work only on this sheet** (on both sides, if needed); do not turn in any supplementary sheets of paper. There is actually plenty of room for your answers, as long as you organize yourself BEFORE starting writing.

**Note:** There is an ASCII table on p.37.

1. Suppose our machine has 5-bit word size, with 2’s complement storage.
   
   (a) (10) Using 0s and 1s, show the representations of +5 and -5.
   
   (b) (20) What are the largest representable positive number and most negative (i.e. largest in absolute value) negative number?
   
   (c) (20) Suppose \( x \) and \( y \) are declared as **int** on this machine. Give an example of positive values of \( x \) and \( y \) for which \( x+y \) is negative.

2. (10) Consider the code
   
   ```c
   char c = '+';
   ```
   
   Give the hex form of the byte at which \( c \) is stored.

3. (20) Consider the code at the top of p.20. If \( I \) were read in as 22, would any element of \( X \) be affected? If so, state which one; if not, state why not.

4. (20) Consider the code
   
   ```c
   int x;
   strncpy(&x,"88",2);
   printf("\%d\n",x);
   ```
   
   Say this is run on a 16-bit machine. State what value will be printed out. Your answer must be in the form of a numerical expression, e.g. \( 3.45 \times 5^{12} - 13 \).

**Solutions:**

1. \( 00101, 11011; 15, -16; 8+8 \) is -16, for example
2. \( 0\times2b \)
3. \( X[2] \)
4. '8' has ASCII code \( 0x38 \), so the contents of \( x \) will be \( 0x3838 \), and the value printed out will be \( 3 \times 16^3 + 8 \times 16^2 + 3 \times 16^1 + 8 \times 16^0 \).