*Always show all work for full credit.*

1. Determine the largest & smallest values (in decimal) that can be represented with 13-bits number for each representation:

a. Sign/magnitude

b. Unsigned

c. Two’s complement

2. Fill in the missing values in the following table:

|  |  |  |
| --- | --- | --- |
| **Binary** | **Decimal** | **Hex** |
|  | 36 |  |
|  | 268 |  |
|  |  | 7E |
|  |  | 32 |

3. Convert the following numbers to 8-bit, two’s complement:

a. 56

b. -42

4. Convert the following 8-bit, two’s complement numbers to decimal:

a. 1001 0101

b. 0110 1010

5. Perform the following additions of two’s complement numbers:

a. 1011 0111 b. 0111 0101 c. 0111 1111

**+** 0111 0110 **+** 0111 0011 **+** 0000 0001

6. Exercise 1.73 from the text: “A majority gate produces a TRUE output if and only if more than

half of its inputs are TRUE. Complete a truth table for the three-input majority

gate shown in Figure 1.42.”



Figure 1.42

7. Convert the following 8-bit two’s complement numbers to 16-bit two’s complement numbers with the same value.

a. 1001 0101

b. 0110 1100