

Work out the following arithmetic in binary. Convert each number to a **5 bit** binary number and convert the answer back to Base10. Show **all** your work. Also state whether there was a carry out and an overflow on 1 to 6. **You must use two complement algorithms.** Write neatly, if I can't read it, then it is wrong.

1 through 6 is worth 2 points each.

1. 5 2. 6 3. 15 4. -9 5. -6 6. 10
 +3 +7 -6 -9 +6 +7

The multiplication is worth 4 points each. (YOU MUST use booth's algorithm)

7. 7 8. -9
 x5 x4

Extra credit (optional)

9. The division is worth 2 extra credit points.

$$12 \div 3$$

For the following two questions, use Hamming Error Detection and Correction algorithm. (chapter 2, part 4, about slide 27)

10. Write out the base 10 number 211 with the parity bits (remember the solution will have 12 bits). 4 points

11. Is the following correct? If not, what is the correct value?

- a. 110101000111 (3 points)
b. 101111110001 (3 points)

Turn in:

1. No cover sheet is needed, just put your name and section number at the top of the page.
2. The printed or hand written answers to 1-11 (remember 9 is optional).