Questions:

1. What extra step do we take when we form the 2's complement of a negative binary number?

    - The extra step is adding 1 to our complimented (flipping bits) number.

2. Write the 2's complement for each of the following 5-bit binary numbers.

    1. $01001 = 01001_2$

    2. $01011 = 01011_2$

    3. $00111 = 00111_2$

    4. $00001 = 00001_2$

3. In 2's complement, what do all the positive numbers have in common?

    Positive numbers begin with a 0

4. What advantage does 2's complement have over 1's complement?

In two's compliment we have only one way to represent 0. This simplifies our representation and have major advantage for designing hardwares.

5. If you want to write the number 7_{10} using 2's complement representation, what do you need to do?

    Convert 7_{10} to binary.

6. What is the general technique for converting a decimal number to 2's complement representation?

    - If the number is positive, convert it to binary.
    - If the number is negative, write the positive value of the number in binary
    - Reverse each bit and add 1 to the complemented number.

7. Convert the following decimal numbers to binary using 6-bit 2's complement representation.

    - $16_{10} = 110000_2$
    - $13_{10} = 001101_2$
    - $3_{10} = 111101_2$
    - $10_{10} = 110110_2$
    - $26_{10} = 011010_2$
    - $31_{10} = 100001_2$