(Any thing reasonable should be fine) As Answer.

(2) 
$$A = 11110100$$

$$B = 10110111 (+)$$

$$A+B = 1 [010101]$$

$$Carry (discarded).$$

(3) 
$$3 \Rightarrow 0011$$
 (4-bit)

1) Step 1: Flip the bits = 1100  
2) Step 2: Add 1 = 1100 +1 = 1101 
$$\Rightarrow$$
 -3

1) 
$$f(ip me bits = 1110 + 1 = 1111 \Rightarrow -1$$
  
2)  $Add 1 = 1110 + 1 = 1111 \Rightarrow -1$ 

Now, 
$$-3-1 \Rightarrow (-3) + (-1)$$
:

-3: |10|

-1: |111| (+)

Discard.

Now 
$$(-3-1)-1 = (-3-1)+(-1)$$

$$-3-1: 1100$$

$$-1: 1111 (+)$$
Discard

Ans is negative: 1011

To get the absolute value, do a 2's complement

D flipthe bits = 0100

2) Add 1 = 0100+1 =0101

010| is 5
Answer is -5

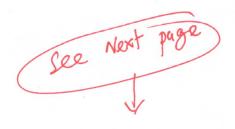
(5) - 58 it can be done in many ways:

Approach 1: (1) convert the number to Hex.
(2) perform a compliment.

Approach 2: (1) Convert the number to binary

(2) Perform z's complement

(3) Convert back to Hexadecimal.



Approach-1

58 to Hexadecimal:

| Division 58/16 | Result | Remainder 10 → (A) |
|----------------|--------|--------------------|
| 3/16           | 0      | 3                  |

58 is 3A.

58 in 16 bit = 00 3 A.

complement of 003 A.

- (1) FFFF 003A = FFC5
- (2) Add 1: FFC5+1 = FFC6.

Ans: FFC6 & CO

Approach-2

58 in binary => 111010

58 in 160-bit = 0000 0000 0011 1010

e's complement:

D Aip: 1111111111111000101

2) Add1: 1111111000110

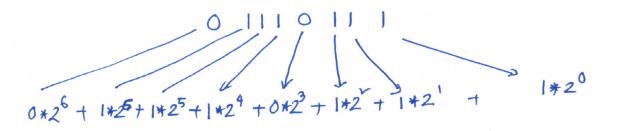
In Hexadeimal: F F C 6

Ans: FFC6

(Answer CE also gets full points

<u>(a)</u> (a) 01110111

MSB is 0 here. 50, the number is positive.



6 6

1111 0001

MSB is 1, so number is negative.

Do a e's complement:

$$= 00001110+1 = 00001111$$

Convert to binary:

$$0*2^{7} + 0*2^{6} + 0*2^{5} + 0*2^{4} + 1*2^{3} + 1*2^{4} + 1*2^{6} + 1*2^{6} + 0*2^{5} + 0*2^{6} + 0*2^$$

(8) The signed range of 4-bit storage is
$$-2^{n-1} to +2^{n-1}-1$$

$$\Rightarrow -2^{4-1} to +2^{4-1}-1$$

$$\Rightarrow -2^{3} to +2^{3}-1$$

$$\Rightarrow -8 to +7$$
So, -10 is out of range for 4-bit.

No possible to store -10

The smallest 120-bit signed integer = 
$$-2^{n-1}$$
  
=  $-2^{120-1}$   
=  $-2^{119}$ 

