## How to convert decimal numbers to 8 bit 2's complement

If you are not sure how to convert decimal numbers to 8 bit 2's complement form then have a look at this short video tutorial by PCC videos: http://www.youtube.com/watch?v=WrSMzaEkrO4

Here's an example: Convert (- 47) into 8 bit 2's complement

Step 1) change the decimal number to binary 101111

Step 2) ensure the number is 8 bit by adding zero's to the left hand side 00101111

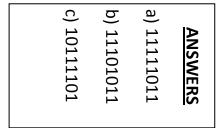
Step 3) invert the number by changing all the 1's to zero and all the zeros to 1 11010000

Step 4) add 1 to the right hand side 11010001

So the final answer is -47 = 11010001

Now try these:-

- a) Convert the decimal number (-5) into 8 bit 2's complement
- b) Change (-21) into 8 bit 2's complement
- c) Express (- 67) as an 8 bit 2's complement number



## Binary subtraction using 8 bit 2's complement

Computers do not manage direct subtraction very well. We can get round this problem by **adding negative** numbers when they are in 8 bit 2's complement form.

Step 1) Convert the positive number into binary making sure it is 8 bits long, if it is too short just add zeros to the left hand side.

Step 2) Convert the negative number into 8 bits 2's complement form. DO NOT convert the positive number.

Step 3) Add the numbers together using binary addition.

Step 4) Ignore any overflow: If you have a 9 bit number as your final answer, ignore the biggest place value on the left hand side so that your answer is 8 bits long.

Now try these:-

1) 
$$15 - 5$$

$$3) 100 - 67$$

