

1. (a) (2 points) For the following four numbers given in decimal or hexadecimal notation, write the corresponding binary number using the indicated format.

$(-6)_{10}$ using 6-bit sign magnitude:	<u>$(10\ 0110)_2$</u>
$(37)_{10}$ using 6-bit unsigned:	<u>$(10\ 0101)_2$</u>
$(-28)_{10}$ using 6-bit two's complement:	<u>$(10\ 0100)_2$</u>
$(2B)_{16}$ using 6-bit unsigned:	<u>$(10\ 1011)_2$</u>

- (b) (3 points) State whether the following statements about the binary representation of numbers are *true* or *false*. Give **brief** explanations for the statements that are *false*.

- Both two's complement and sign/magnitude representation can be used to represent negative numbers in binary.

Solution: True, however it is more difficult to design arithmetic circuits that work with sign/magnitude format. Still they are used.

- Using N bits it is possible to represent 2^N different numbers when an unsigned number system is used.

Solution: True.

- While there are methods to represent both positive and negative integers, it is not possible to represent fractions or real numbers using binary numbers.

Solution: False, fixed and floating point number systems can be used to represent such numbers.