English Name: ______________________

Quiz Preparation: Converting Values

1. Write the appropriate vocabulary word next to its definition.

a)		a set of 4 binary digits
b)		a set of 8 binary digits
c)		a name for the base-2 number system
d)		a name for the base-16 number system
e)		an operation that inverts (or “flips”) the bits of a binary number (0 ↔ 1)
f)		to change from one form to another, for example from binary to decimal

2. Given the binary number 1110_1001, make the conversions specified below. It is easy to make small mistakes, so show your work for partial marks.

a) Convert the value to decimal, assuming the byte represents an ***unsigned number***.

b) Convert the value to decimal, assuming the byte represents a ***sign and magnitude***.

c) Convert the value to decimal, assuming the byte represents a ***two’s complement*** number.

d) Convert the value to *hexadecimal.*

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3. Again working with the same binary number, 1110_1001, complete the tables below. It is easy to make small mistakes, so show your work for partial marks.

a) Perform a ***left shift*** by two bit positions, then convert the result to decimal, assuming the byte represents an ***unsigned number***.

b) A ***left shift*** by two bit positions should be equivalent to multiplication by four (×4); however the value calculated in part (3a) is obviously not even close to four times the value calculated in part (2a). What word describes what happened.

c) Perform a ***logical right shift*** by two bit positions, then convert the result to decimal, assuming the byte represents an ***unsigned number***.

d) *Perform a* ***logical right shift*** by two bit positions, as was done in part (c), then convert the result to ***hexadecimal***.

e) What mathematical operation (operator and operand) is equivalent to a ***logical right shift*** by two bit positions, assuming the byte represents an ***unsigned number***.

operand (binary)	operator	operand (decimal)
1110_1001		

Note: the reason this mathematical expression isn't exactly true is due to the ***loss of precision*** as bits are shifted out of the number, and lost.

f) Perform an ***arithmetic right shift*** by two bit positions, then convert the result to decimal, assuming the byte represents a ***two's complement*** number.