COMP 222 **NAME:**_____
Quick Quiz #3: Hamming Codes
Fill in the blanks, no scantron required.

Problem 1 Given the 8-bit data word 0x57, compute the 12-bit code word.

Expand data word to binary and place in table

8	7	6	5	4	3	2	1

Calculate check bits (xor of indicated data bits)

Bit 1	12457	
Bit 2	13467	
Bit 3	2348	
Bit 4	5678	

Reposition original data bits and calculated check bits into 12-bit code word.

12	11	10	9	8	7	6	5	4	3	2	1

Code word in hex: _____

Problem 2 Given the 8-bit data word 0xAB, compute the 12-bit code word.

Expand data word to binary and place in table

8	7	6	5	4	3	2	1

Calculate check bits (xor of indicated data bits)

Bit 1	12457	
Bit 2	13467	
Bit 3	2348	
Bit 4	5678	

Reposition original data bits and calculated check bits into 12-bit code word.

12	11	10	9	8	7	6	5	4	3	2	1

Code word in hex: _____

Problem 3 Given 12-bit code word 0x7C1, extract the data bits, determine bit error if any, and if so, correct it.

Expand 12-bit code word into binary.

12	11	10	9	8	7	6	5	4	3	2	1

Extract data bits from code word into table.

8	7	6	5	4	3	2	1

Recalculate check bits (xor of indicated data bits)

Bit 1	12457	
Bit 2	13467	
Bit 3	2348	
Bit 4	5678	

Compare stored check bits with recalculated check bits

	Bit 4	Bit 3	Bit 2	Bit 1
Original				
Recalculated				
Xor				

Code Word Bit In Error: _____ = Data Bit In Error _____

Corrected Data Word in Hex: _____
(same as extracted data word if no error)

Problem 4 Given 12-bit code word 0x9DD, extract the data bits, determine bit error if any, and if so, correct it.

Expand 12-bit code word into binary.

12	11	10	9	8	7	6	5	4	3	2	1

Extract data bits from code word into table.

8	7	6	5	4	3	2	1

Recalculate check bits (xor of indicated data bits)

Bit 1	12457	
Bit 2	13467	
Bit 3	2348	
Bit 4	5678	

Compare stored check bits with recalculated check bits

	Bit 4	Bit 3	Bit 2	Bit 1
Original				
Recalculated				
Xor				

Code Word Bit In Error: _____ = Data Bit In Error _____

Corrected Data Word in Hex: _____
(same as extracted data word if no error)