Internet Protocol Tutorial Questions

Question 1

An IPv4 datagram with no header options and with 2000 bytes/octets of message data (i.e. the data after the header) is to be transmitted from a host on a network A to its destination on a network D via one of two different networks, B and C. The maximum transmission units (MTU) of networks A and D are both 3000 bytes/octets, those of B and C are 704 and 1500 bytes/octets, respectively.

a) Calculate the number and size of fragments, and their fragment offset values, when the datagram follows the route over B to reach its final destination.
b) Calculate the number and size of fragments, and their fragment offset values, when the datagram follows the route over C to reach its final destination.
c) Explain briefly what happens if the route followed is through B then C. Similarly, explain what occurs if the datagram passes through C then B. What is the number of fragments in each case?

Question 2

The one's complement sum of all 16 bit words of an IPv4 header, except the first, is 11001010 01011001 (binary). Given that the first two bytes are 69 and 128 (decimal), calculate the final IP header checksum in binary (show your working).

Explain what the checksum is used for.