Quiz 3

Problem 1
Consider the following experiment: Select two 500-character English messages M_1 and M_2 at random. Encrypt M_1 under a keyword Vigenère cipher using keyword "UMBC" to produce ciphertext C_1. Similarly, encrypt M_2 under a keyword Vigenère cipher using keyword "FIFE" to produce ciphertext C_2. Let x_1 be the Index of Coincidence (I.C.) of C_1, and let x_2 be the I.C. of C_2.

Which of the following experimental outcomes is most likely? Circle one response. Carefully explain and justify your reasoning.

i) $x_1 < x_2$

ii) $x_1 > x_2$

iii) $x_1 = x_2$

iv) $|x_1 - x_2| < 0.0001$

v) It is impossible to guess with any advantage which of x_1 or x_2 will be larger.