I. Three charges, \( q_1 = +2.0 \, \mu\text{C}, \quad q_2 = -1.0 \, \mu\text{C} \) and \( q_3 = q_2 = -1.0 \, \mu\text{C} \) are arranged at the three corners of a square of length \( \ell = 10.0 \, \text{cm} \), as shown in the figure below. With the coordinate system indicated in the figure, calculate the electric field due to these three charges at the empty corner of the square.

Note: calculate the graphical sum as well as the analytical one.
II. A fourth charge \( q_4 = -3.0 \text{ mC} \) is now placed at the empty corner of the square. Assuming that the other three charges are held in place, calculate the electrostatic force on \( q_4 \) due to the charges \( q_1, q_2 \) and \( q_3 \).