Homework Discussion, Week 2

Physics 1302   Dr. Andersen

Chapter 19

24.) (Note that this question is similar to example 19-3 in the book.) a) We need to 1) find the strength of the force between q_1 and q_2, and q_1 and q_3 (since we are interested in what will happen to q_1, 2) determine the components of these forces from the diagram (see example 19-3 for example of doing this), 3) add the components together, 4) use the Pythagorean Theorem to find net force from components. b) The electric force is proportional to $1/r^2$, so doubling the dimensions of the problem would decrease the force by $2^2 = 4$ times.

Answer: 59 N, 67° below the negative-x axis.

36.) (a) Similar to example 19-5 in the text. (b) Because all the charges are equal in magnitude, at the point equidistant between the two positive charges the field due to those charges will cancel out, meaning that the only charge contributing to the field at that point is q_3. Because q_2 and q_3 are of opposite sign, the field halfway between them does not cancel, so all three charges will contribute to the field, and thus it will be stronger at that point than between q_1 and q_2.

Answer: (a) 7.9×10^7 N/C. (c) 4.8×10^8 N/C.

69.) Determine the x- and y-components of of the force due to each of the three other charges acting on Q. Add these together to find the total x- and y-components of the force acting. Since we want q to be static, set each of these components equal to zero. Solve either the x- or y-component equation for Q (just need to solve one, since both equations are identical.)

71.) Similar to example problem worked on the "Homework Solution Format" handout, given out in class.