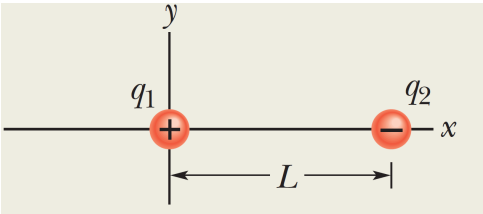
Charge Problems

1. An α particle (the nucleus of a helium atom) has mass $m = 6.64 \times 10^{-27}$ kg and charge $q = +2eC$. Compare the magnitude of the electric repulsion between two α ("alpha") particles with that of the gravitational attraction between them.

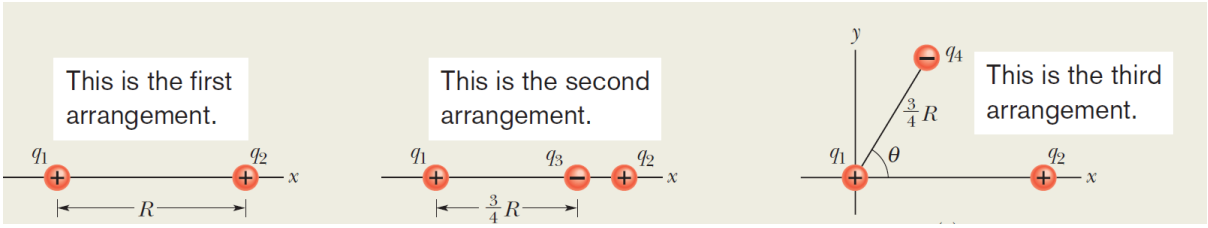
2. The figure below show two particles fixed in place: a particle of charge $q_1 = +8q$ at the origin and a particle of charge $q_2 = -2q$ at $x = L$. At what point (other than infinitely far away) can a proton be placed so that it is in equilibrium (the net force on it is zero)?



3.A particle carries a charge of 4.8×10^{-19} C. How many elementary charges does this correspond to?

4. In the figure below $q_1 = 1.6 \times 10^{-19}C, q_2 = 3.2 \times 10^{-19}C, q_3 = -3.2 \times 10^{-19}C$ $q_4 = -3.2 \times 10^{-19}C, R = 0.0200m$ and $\theta = 60°$

- What is the force on particle 1 due to particle 2 in the first arrangement?
- What is the net force on particle 1 due to particles 2 and 3 in the second arrangement?
- What is the force on particle 1 due to particles 2 and 4 in the third arrangement?



5. In the figure below all four particles are fixed in the xy plane, and $q_1 = -3.20 \times 10^{-19}C, q_2 = 3.20 \times 10^{-19}C, q_3 = 6.40 \times 10^{-19}C, q_4 = -3.20 \times 10^{-19}C, \theta_1 = 35.0°, d_1 = 3.00cm$, and $d_2 = d_3 = 2.00cm$. What are the magnitude and direction of the net electrostatic force on particle 4 due to the other three particles?