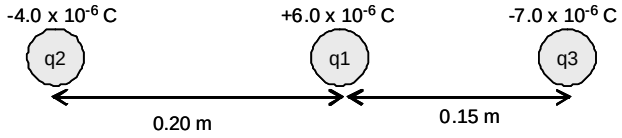
Name: _____

Review Worksheet

Electric Forces and Fields

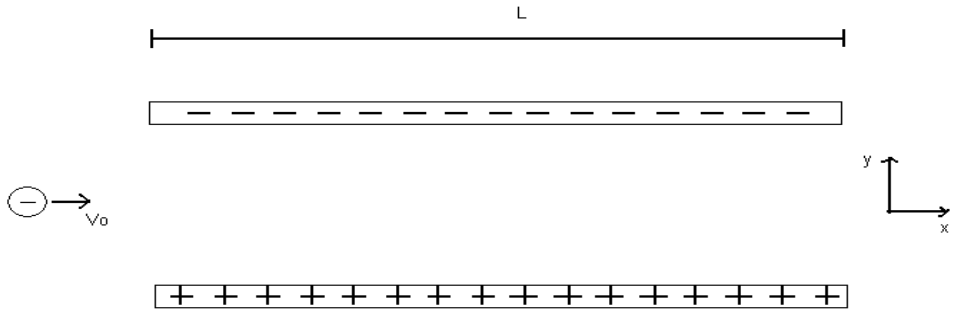
1. The figure below shows three point charges that lie along the x axis.



   a. Determine the magnitude and direction of the net electrostatic force on charge q_1:

   b. Determine the magnitude and direction of the electric field at the point where q1 lies:

2. An electron enters the region of a uniform electric field as shown below. Assume the initial velocity of the particle to be 3.0 x 10^6 m/s and the Electric Field strength to be 200 N/C. The horizontal length of the plates is also known to be 10.0 cm.



   a. Find the acceleration of the electron while in the field:

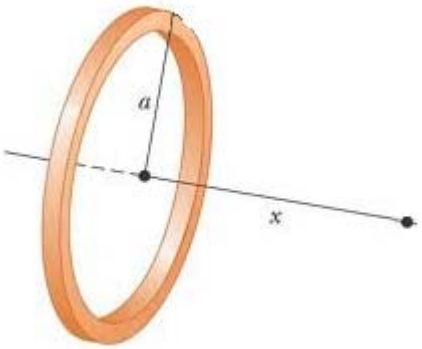
   b. Find the time at which it leaves the field if it enters at t = 0s:

   c. What is its vertical position when it leaves the field if it enters at y_o = 0m?

3. A rod 10.0 cm long is uniformly charged and has a total charge of -25.0 μC. Determine the magnitude and direction of the electric field along the axis of the rod at a point 42.0 cm from its center. Make sure to state its direction.

_____ N/C

4. Below is a uniformly charged ring of total charge *Q* and radius *a*. Determine an expression for the electric field strength along the axis of the ring at a distance *x* from the center of the ring.



5. Find the electric field on the axis of the ring from #4 at the following distances from the center of the ring. Assume that *a* = 10.0 cm and the ring has a total charge of 93.0 μC.

   a. 1.00 cm
   _____ **i** MN/C

   b. 5.00 cm
   _____ **i** MN/C

   c. 30.00 cm
   _____ **i** MN/C

6. Two small spheres of mass *m* are suspended from string of length *l* that are connected at a common point. One sphere has charge *Q* and the other charge *2Q*. The strings make angles Θ_1 and Θ_2 with the vertical.
    a. Explain how Θ_1 and Θ_2 are related
    b. Assume Θ_1 and Θ_2 are small. Show that the distance between the spheres is approximately

$$r \approx \left(\frac{4k_e Q^2 l}{mg} \right)^{1/3}$$

7. A charged cork ball of mass 1.00g is suspended on a light string in the presence of a uniform electric field. When $E = (3.00i + 5.00j) \times 10^5 N/C$, the ball is in equilibrium at $\Theta = 37^o$. Find:
    a. The charge on the ball
    b. The tension in the string