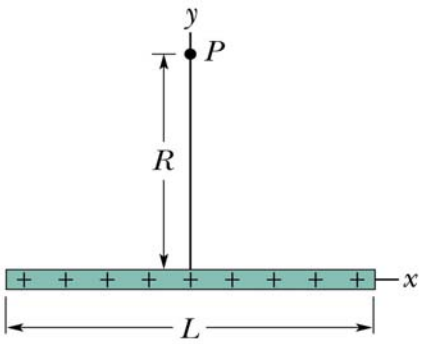
First Midterm, Phyx 135-2-01, Fall 2013 **Name _____**

1) A charge of +3.0 μC is located at $x_1 = 3.5$ cm and $y_1 = 0.50$ cm. A second charge of –4.0 μC is located at $x_2 = -2.0$ cm and $y_2 = 1.5$ cm.

a) What is the magnitude of the electrostatic force operating between them?

b) If the positive x-axis defines $\theta = 0$, at what angle is the force operating on charge 1?

2) Suppose you have a uniform, nonconducting rod of length L which contains a total charge of q distributed along it. Write down a definite integral that would give you the electric field at a point P which is midway along the rod and a distance R from it. (You do not have to solve the integral, just write it down.) For partial credit, it would be wise to explain what you are doing.



3) Two infinite, nonconducting sheets of charge are parallel to each other and located a distance d = 40 cm apart. They contain equal but oppositely signed amounts of charge. If the potential difference between the sheets is 200 volts, how much charge is contained (on either sheet) within a circle of radius = 2 meters?

4) Suppose four charges of magnitude q = e = 1.6 x 10^{-19} C are arranged as shown at right. a = 5 nm. How many eV of energy would you need to pull the charges apart and place them at infinity?