Homework 3
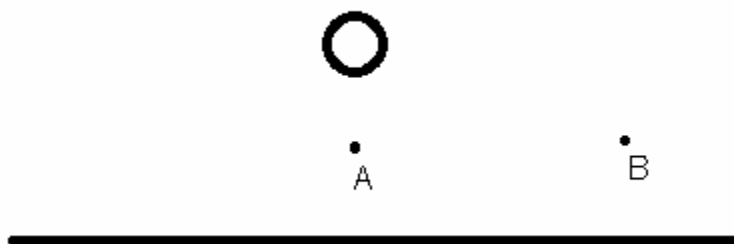**PHYS 1404**
due February 12, 2004

Homework should be written out neatly on a separate sheet of paper. Explain your reasoning.

1) A large negatively charged metal plate is lying horizontally, as in the picture below. A negatively charged conducting ball is located, as shown, above the plate. Points A and B are points in space, not charges.


Draw possible electric field lines. Explain why you drew the field lines the way you did. Is the field stronger, at point A or point B? Explain.

2) Consider a negatively charged particle entering a region between two charged plates, as shown in the diagram below. The initial velocity of the particle is 7.0×10^7 m/s. The mass of the particle is 9.1×10^{-31}kg and the charge is -1.6×10^{-19}C. The distance between the plates is 0.025m. You can consider the electrical force to be the only force acting between the plates. (The force of gravity is negligible and can be considered to be zero in this problem.) Determine the magnitude and the direction of the electric field, if the particle just reaches the negative plate (if the velocity at the negative plate is zero). Show your work and explain your reasoning.
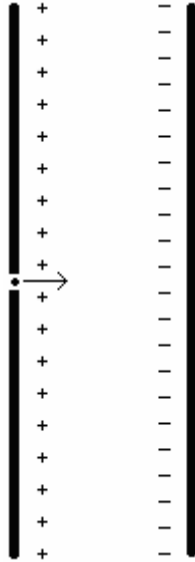
3) A +3q point charge and a –3q point charge are each placed 0.8m from point A, as in the diagram below. Point A is a point in space and not a charge.
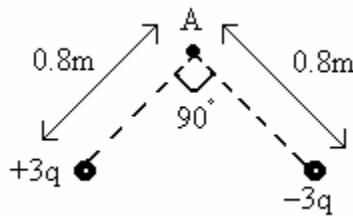
Where could a third charge be placed so that the magnitude of the net electric field at point A would be zero? Determine the location, magnitude and sign (positive or negative) of a charge that would result in a net electric field at point A. Show your work and explain your reasoning.