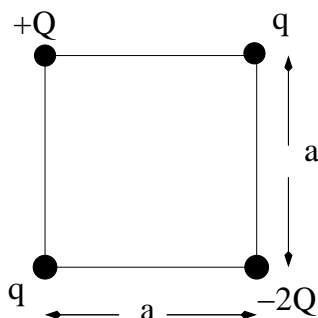


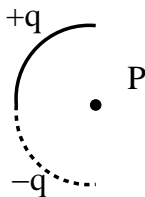
Practice Exam # 1 – Physics 152

Be sure to include pictures, coordinate systems, etc. where reasonable. Be explicit about what arguments you are using when determining a physical quantity, (e.g. \vec{E}).

1. In Figure below is shown a distribution of charges. What is q in terms of Q if the net electrostatic force on the charged particle at the upper left corner of the square array is to be zero?



2. What is an electric field? Why is it a useful idea?
3. A thin glass rod is bent in the shape of a semicircle of radius r . A charge of $+q$ is uniformly distributed on the upper half and a charge $-q$ is uniformly distributed along the lower half of the circle. Find the magnitude and direction of the electric field at P , the center of the semicircle.



4. A long, nonconducting solid cylinder of radius 4.0cm has a nonuniform volume charge density ρ that is a function of the radial distance r from

the axis of the cylinder, where $\rho = Ar^2$ with $A = 2.5\mu C/m^5$. What is the magnitude of the electric field at a distance of

- (a) 3.0cm from the axis of the cylinder?
- (b) 5.0cm from the axis of the cylinder?

5. In the following figure how much work is required to bring the charge of $+5q$ from infinity to the point shown along the dotted line?

