Do the following problems from the text
3.2, 3.3, 3.6, 3.8

also

3.5’ Two point charges, Q1 and Q2, are located at (4,4,0) and (.10,0,0) respectively.

a. Use Coulomb’s law to generate a formula for the electric field everywhere in space.

b. Plot the x component of the electric field versus x for y = -2, 0., 2., and 6. for Q1 = 4\pi\varepsilon_0 and Q2 = -4\pi\varepsilon_0. Use MATLAB.

c. Plot the y component of the electric field versus x for y = -2, 0., 2., and 6. for Q1 = 4\pi\varepsilon_0 and Q2 = -4\pi\varepsilon_0. Use MATLAB.

d. Plot the location of the charges in the x-y plane, and draw the lines along which the plots of b and c were made. Do your answers to part b and c make sense?

e. Plot the components of the electric field in the x - y plane using the MATLAB command quiver. Be careful to avoid dividing by zero. A sample program that does this is attached below.

3.8’ Use MATLAB to generate electric field line plots for the problem 3.8 in the text. Take b=1.0 and \rho_l=4\pi\varepsilon_0/\pi b. Approximate the line charge by a sequence of a large number of point charges.

*****Quiver Example:

```matlab
% Plots electric field lines in x-y plane
% due to a point charge at (x0,y0)
% 1. set strength of charge
Q1 = 1.0;
% 2. set location of point charge
x0=1.;
y0=.5;
% 3. define intervals in x and y for calculation
x = -2:.2:2; y = -2:.2:2;
% 4. create matrices that define a grid in the x-y plane
[xx,yy] = meshgrid(x,y);
% 5. calculate distance to each point
rr=((xx-x0).^2.+(yy-y0).^2.).^1/2.;
% 6 cube distance
rr3=rr.^3;
% 7. calculate Ex and Ey
Ex=Q1*(xx-x0)./(rr3+.001);
Ey=Q1*(yy-y0)./(rr3+.001);
% 8. plot results
quiver(x,y,Ex,Ey,1);
```