Name: _____

1 Problems*

1. (21-27) Three point charges are on the x axis:

$$
\begin{aligned}
q_1 &= -6.0\mu C \text{ at } x = -3.0m \\
q_2 &= 4.0\mu C \text{ at } x = 0m \\
q_3 &= -6.0\mu C \text{ at } x = 3.0m
\end{aligned}
$$

Find the electric force on q_1. Recall that $F_e = \frac{kq_1q_2}{r^2}$, and that the net force is the sum of all forces acting on the particle. Treat each particle separately (that is, find the force on q_1 from the other particles one by one, and then add those results up).

2. (21-43) A -5.0 μC point charge is located at $x = 4.0m$ and $y = -2.0m$, and a 12-μC point charge is located at $x = 1.0m$ and $y = 2.0m$.

   (a) Find the magnitude and direction of the electric field at $x = -1.0 - m$, $y = 0$. Remember: first find the magnitude and direction in vector notation $\hat{i}, \hat{j}$ for each charge separately at this location, and then simply add those up vectorally (add all the i's and all the j's separately).

   (b) Calculate the magnitude and direction of the electric force on an electron that is placed at this same location.

3. (21-53) An electron has an initial velocity of 2.00×10^6 m/s in the $+x$ direction. It enters a region that has a uniform electric field $\vec{E} = (300N/C)\hat{j}$

   (a) Find the acceleration of the electron.

   (b) How long does it take for the electron to travel 10.0 cm in the $+x$ direction in the region that has the field?

   (c) Through what angle, and in what direction, is the electron deflected while traveling the 10.0 cm in the x direction?

4. (22-33) A single point charge is placed at the center of an imaginary cube that has $20 - cm$ long edges. The electric flux out of one of the cube's sides is -1.50 kNm^2/C. How much charge is at the center? Hint: How many sides to a cube? This shouldn't require integration!