Quiz 1

You may or may not make use of the following:

$\epsilon_0 = 8.85 \times 10^{-12}\ Nm^2C^{-2} \quad k = \frac{1}{4\pi\epsilon_0} = 9 \times 10^9\ C^2N^{-1}m^{-2}$

$|\vec{E}_{\text{dipole,on-axis}}| \approx \frac{1}{4\pi\epsilon_0}\frac{2p}{r^3} \qquad |\vec{E}_{\text{dipole,perp}}| \approx \frac{1}{4\pi\epsilon_0}\frac{p}{r^3}$

1. A point charge located at $< 4, 0 >$ meters has a charge of -10 nC. What is the electric field vector at the location $< 1, 4 >$ meters?

2. A certain molecule consists of a positive charge located at $< 2 \times 10^{-12}, 0 >$ meters and a negative charge located at $< -2 \times 10^{-12}, 0 >$ meters. Each charge has a magnitude of $10e$ (one being negative, one being positive). What is the magnitude of the dipole moment, p? You may leave your answer in terms of e.