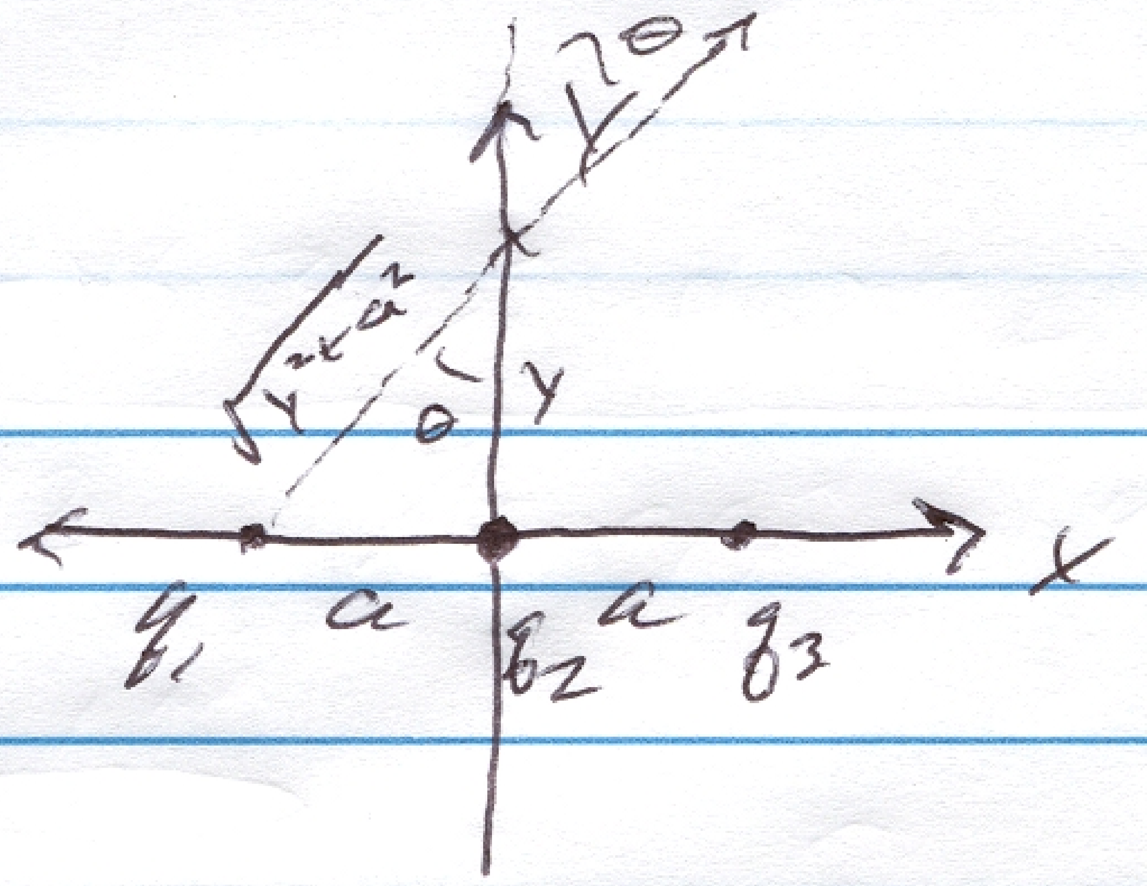
2.



$a = 0.05\,m$

$q_1 = q_3 = +2\mu C \quad q_2 = -4\mu C$

X components of fields of q_1 and q_3 will cancel by symmetry

So $\vec{E} = (2E_{1y} + E_{2y})\hat{y}$

$E_{1y} = \frac{kq_1}{y^2+a^2}\cos\theta = \frac{kq_1 y}{(y^2+a^2)^{3/2}}$

$E_{2y} = -\frac{k|q_2|}{y^2}$

$\vec{E} = \left(\frac{2k(2\mu C)y}{(y^2+a^2)^{3/2}} - \frac{k(4\mu C)}{y^2}\right)\hat{j}$

$\vec{E} = k(4\mu C)\left(\frac{y}{(y^2+a^2)^{3/2}} - \frac{1}{y^2}\right)\hat{j}$

Large y, must expand $(\sqrt{\ })^3$ in 1st 2 terms of binomial expansion.

$y \gg a \quad \frac{y}{(y^2+a^2)^{3/2}} = \frac{1}{y^2(1+a^2/y^2)^{3/2}} \simeq \left(1 - \frac{3}{2}\frac{a^2}{y^2}\right)\frac{1}{y^2}$

$\vec{E} \simeq k(4\mu C)\left[\frac{1}{y^2} - \frac{3}{2}\frac{a^2}{y^4} - \frac{1}{y^2}\right]\hat{j}$

$\vec{E} \simeq -\frac{k(6\mu C)}{y^4}\hat{j}$

monopole $\sim 1/y^2$

dipole $\sim 1/y^3$

quadrupole $\sim 1/y^4$