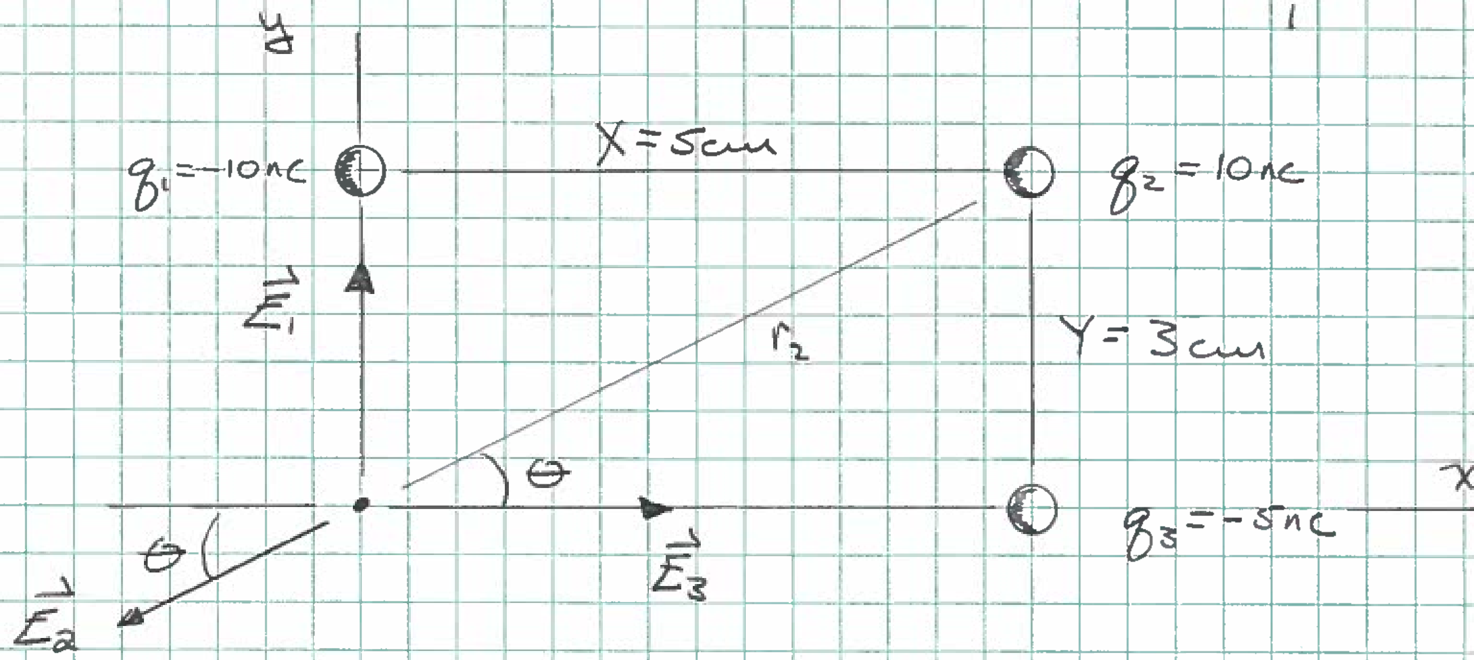


a.) for q_1: $|\vec{E}_1| = \frac{K|q_1|}{r_1^2}$ $\quad r_1 = Y = 0.03m$

$= 9.989 \times 10^4 \, N/c$

$\vec{E}_1 = 9.989 \times 10^4 \hat{j} \, N/c$

for q_3: $|\vec{E}_3| = \frac{K|q_3|}{r_3^2}$ $\quad r_3 = X = 0.05m$

$= 1.789 \times 10^4 \, N/c$

$\vec{E}_3 = 1.789 \times 10^4 \hat{i} \, N/c$

For q_2: $|\vec{E}_2| = \frac{K|q_2|}{r_2^2}$ $\quad r_2 = \sqrt{X^2 + Y^2} = 0.0583m$

$= 2.644 \times 10^4 \, N/c$

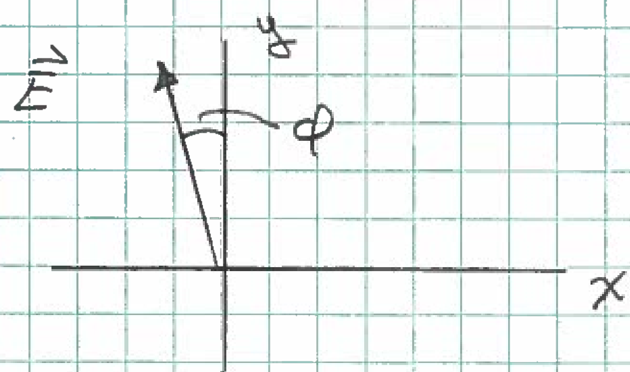
$\vec{E}_2 = -|\vec{E}_2| \cos\theta \, \hat{i} - |\vec{E}_2| \sin\theta \, \hat{j}$ $\quad \theta = \tan^{-1}\left(\frac{Y}{X}\right)$

$= -2.267 \times 10^4 \hat{i} - 1.360 \times 10^4 \hat{j} \, \frac{N}{C}$ $\quad = 30.96°$

Now, $\vec{E} = \vec{E}_1 + \vec{E}_2 + \vec{E}_3$

$$\vec{E} = -4780\hat{i} + 86290\hat{j} \ \text{N/c}$$

b.)



$$E = \sqrt{E_x^2 + E_y^2} = 86420 \ \frac{N}{c}$$

$$\phi = \tan^{-1}\left(\frac{|E_x|}{|E_y|}\right) = 3.171^\circ$$

$\therefore$ angle from $+x$ axis $= \phi + 90^\circ$

$= 93.171^\circ$ ccw from $+x$ axis