22-66
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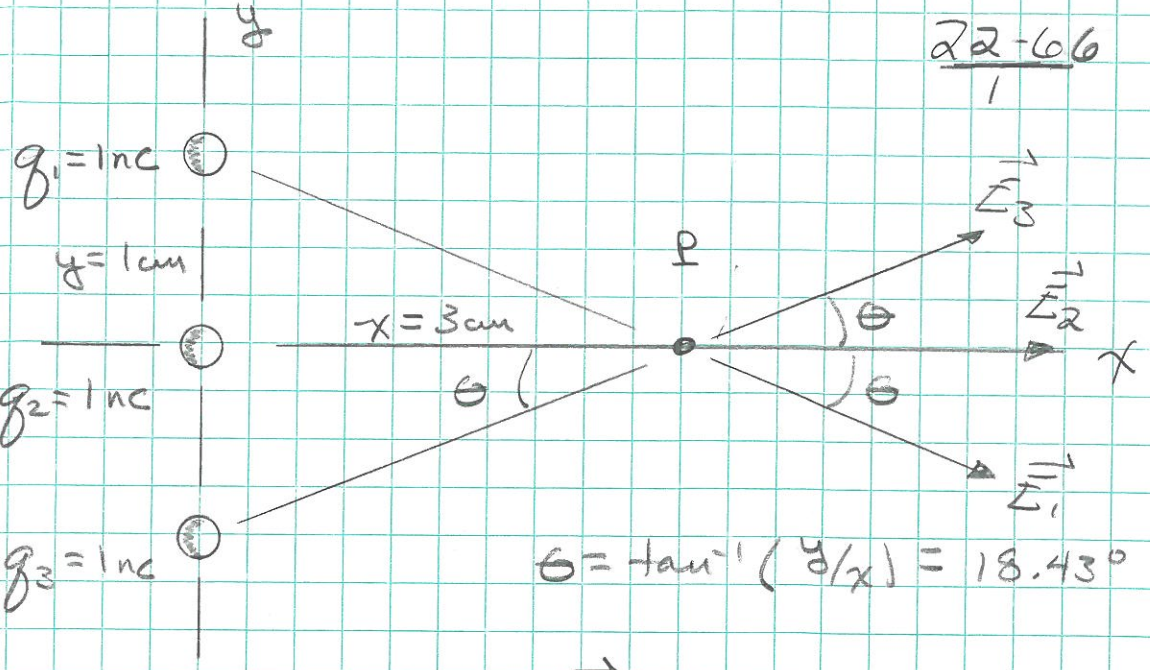

$\theta = \tan^{-1}(y/x) = 18.43°$

a.)

for q_1: $r_1^2 = x^2 + y^2$ $\quad |\vec{E}_1| = \frac{Kq_1}{r_1^2} = \frac{Kq_1}{(x^2+y^2)} = 8990 \frac{N}{C}$

$$\vec{E}_1 = |\vec{E}_1| \cos\theta \hat{i} - |\vec{E}_1| \sin\theta \hat{j}$$

$$\vec{E}_1 = 8528.9 \hat{i} - 2842.1 \hat{j} \ N/C$$

for q_2: $r_2 = x$ $\quad |\vec{E}_2| = \frac{Kq_2}{r_2^2} = 9989 \ N/C$

$$\vec{E}_2 = 9989 \hat{i} \ N/C$$

for q_3: Since $q_3 = q_1$ and from figure

$$\vec{E}_3 = 8528.9 \hat{i} + 2842.1 \hat{j} \ N/C$$

b.) Yes, electric fields vectors for more than one charge can just be added to get the net field.

$$\vec{E} = \vec{E}_1 + \vec{E}_2 + \vec{E}_3 = 27047 \hat{i} \ \frac{N}{C}$$