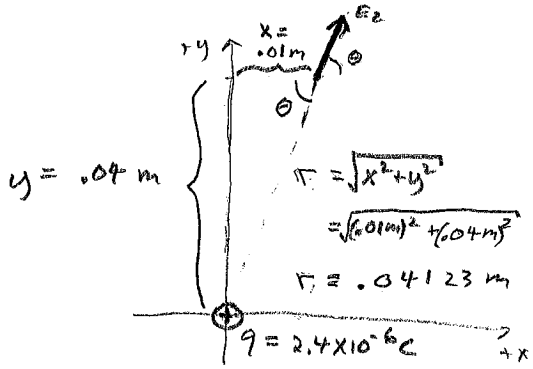
SAC 203-2

Uniform Field: $\vec{E}_1 = 25.0 \times 10^6 \frac{N}{C}\,\hat{i}$

Field $\vec{E}_2$ due to particle at origin: at (1.00cm, 4.00cm)



$\tan\theta = \frac{y}{x}$

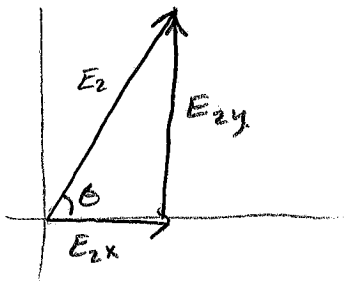
$\theta = \tan^{-1} y/x$

$\theta = \tan^{-1} \frac{.04m}{.01m}$

$\theta = 75.96°$

$$E_2 = \frac{kq}{r^2} = \frac{\left(8.99\times10^9 \frac{N m^2}{C^2}\right) 2.4\times10^{-6} C}{(.04123\,m)^2}$$

$E_2 = 12.69 \times 10^6 \frac{N}{C}$



$E_{2x} = E_2 \cos\theta$

$E_{2x} = \left(12.69 \times 10^6 \frac{N}{C}\right) \cos 75.96°$

$E_{2x} = 3.08 \times 10^6 \frac{N}{C}$

$E_{2y} = E_2 \sin\theta$

$E_{2y} = \left(12.69 \times 10^6 \frac{N}{C}\right) \sin 75.96°$

$E_{2y} = 12.31 \times 10^6 \frac{N}{C}$

$\vec{E}_2 = 3.08\times10^6 \frac{N}{C}\,\hat{i} + 12.31\times10^6 \frac{N}{C}\,\hat{j}$

$\vec{E} = \vec{E}_1 + \vec{E}_2$

$\vec{E} = \left(25.0\times10^6 \frac{N}{C}\,\hat{i}\right) + \left(3.08\times10^6 \frac{N}{C}\,\hat{i} + 12.31 \frac{N}{C}\,\hat{j}\right)$

$\boxed{\vec{E} = 28.1\times10^6 \frac{N}{C}\,\hat{i} + 12.3 \frac{N}{C}\,\hat{j}}$