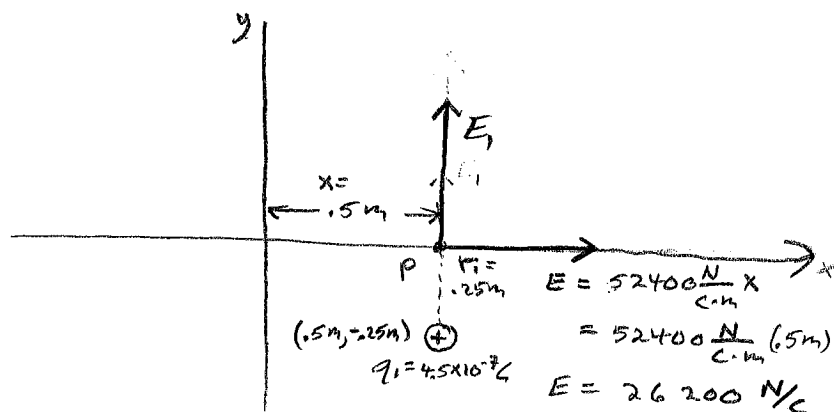
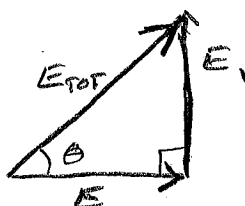


2)



$$E_1 = \frac{k q_1}{r_1^2} = \frac{8.99 \times 10^9 \frac{\text{N} \cdot \text{m}^2}{\text{C}^2} (4.5 \times 10^{-7} \text{ C})}{(0.25 \text{ m})^2} = 64728 \text{ N/C}$$

$$\vec{E}_{\text{TOT}} = \vec{E} + \vec{E}_1$$



$$E_{\text{TOT}} = \sqrt{E^2 + E_1^2} = \sqrt{(26200 \text{ N/C})^2 + (64728 \text{ N/C})^2} = 69829 \text{ N/C}$$

$$\tan \theta = \frac{E_1}{E} \quad \theta = \tan^{-1} \frac{E_1}{E} = \tan^{-1} \frac{64728 \text{ N/C}}{26200 \text{ N/C}} = 68.0^\circ$$

$$F_E = q_2 E_{\text{TOT}} = (1.4 \times 10^{-7} \text{ C}) 69829 \text{ N/C} = 0.009776 \text{ N}$$

$$\begin{aligned} q_2 &= 1.4 \times 10^{-7} \text{ C} \\ m_2 &= 1.42 \times 10^{-4} \text{ kg} \end{aligned}$$

[ $q_2$  is placed at point P]  
(see top diagram.)

$$\sum \vec{F} = m_2 \vec{a}$$

$$F_E = m_2 a$$

$$a = \frac{F_E}{m_2} = \frac{0.009776 \text{ N}}{1.42 \times 10^{-4} \text{ kg}} = 68.8 \text{ m/s}^2$$

$$\boxed{\vec{a} = 68.8 \text{ m/s}^2 \text{ at } 68.0^\circ}$$