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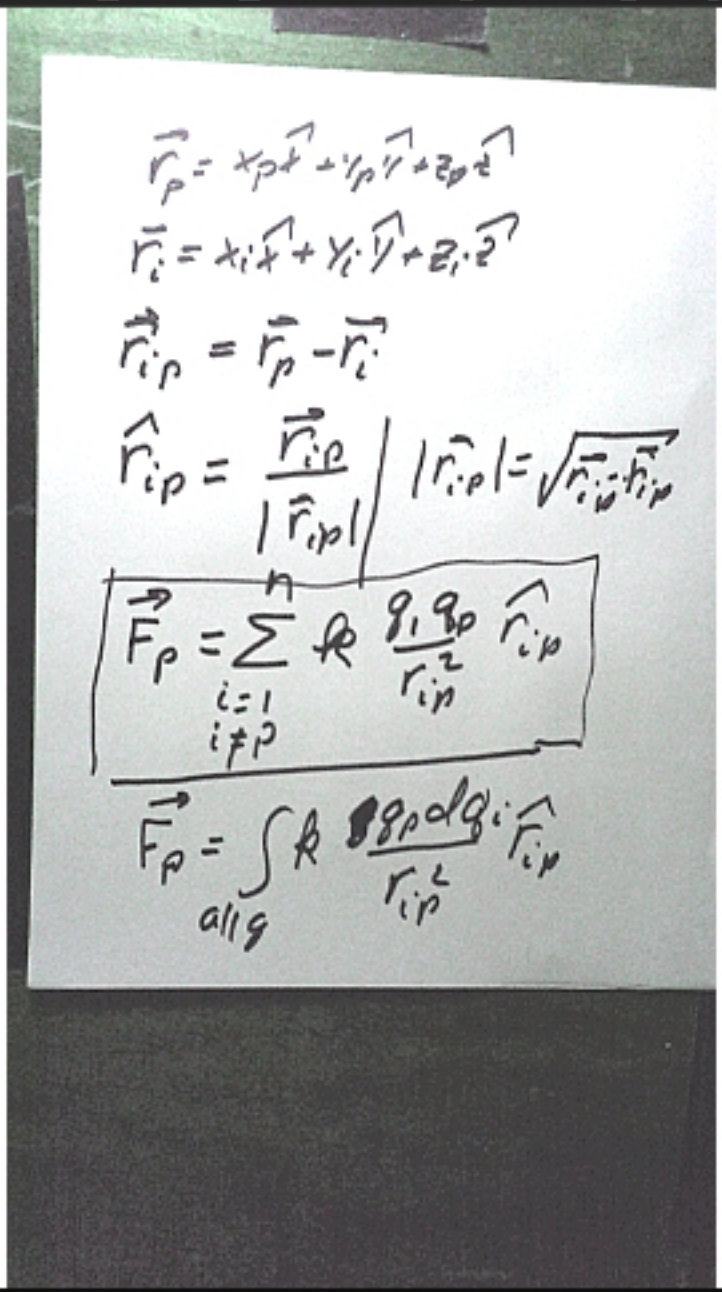

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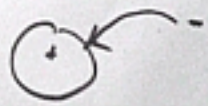
$$\vec{F}_p = q_p k \int_{\substack{\text{all} \\ q_i}} \frac{dq_i}{r_{ip}^2} \hat{r}_{ip}$$

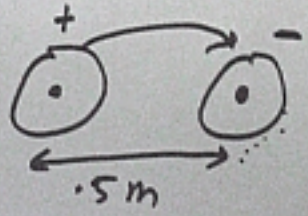
(1) $Q = q_1 + Ne^-$



$= 8\times10^{-6} + 6\times10^{13}(-1.6\times10^{-19})$

$= -1.6\times10^{-6}\,C = -1.6\,\mu C$

(2)



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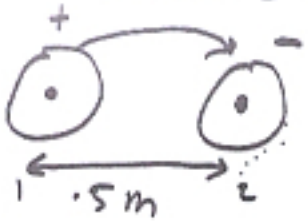
$= -1.6\times10^{-6}\,C = -1.6\,\mu C$

(2)



$Q_1 = N(e^+) = +4.8\,\mu C$

$Q_2 = N(e^-) = -4.8\,\mu C$

$$|\vec{F}| = k\frac{Q_1 Q_2}{r_{12}^2}$$

$$= \frac{8.99\times10^{9}\cdot\mu\cdot\mu\,(3\times10^{15})^2}{(.5)^2}$$

$= 0.8\,N$

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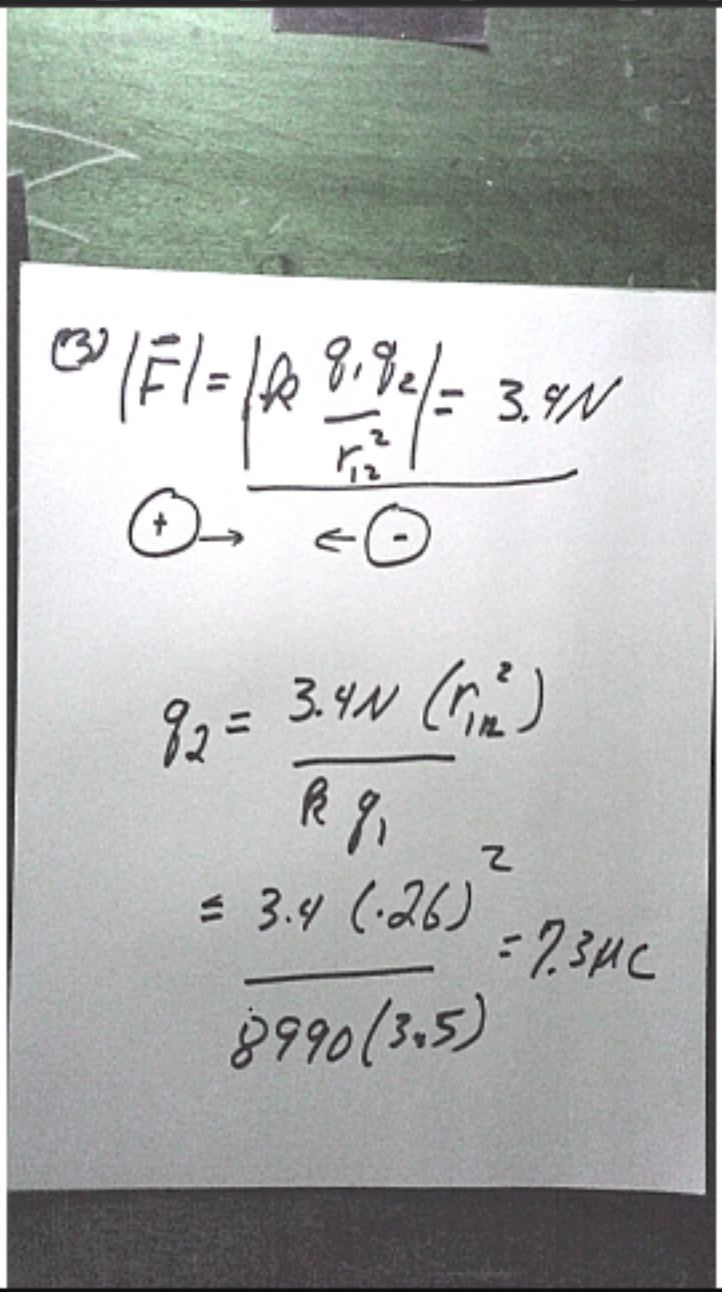

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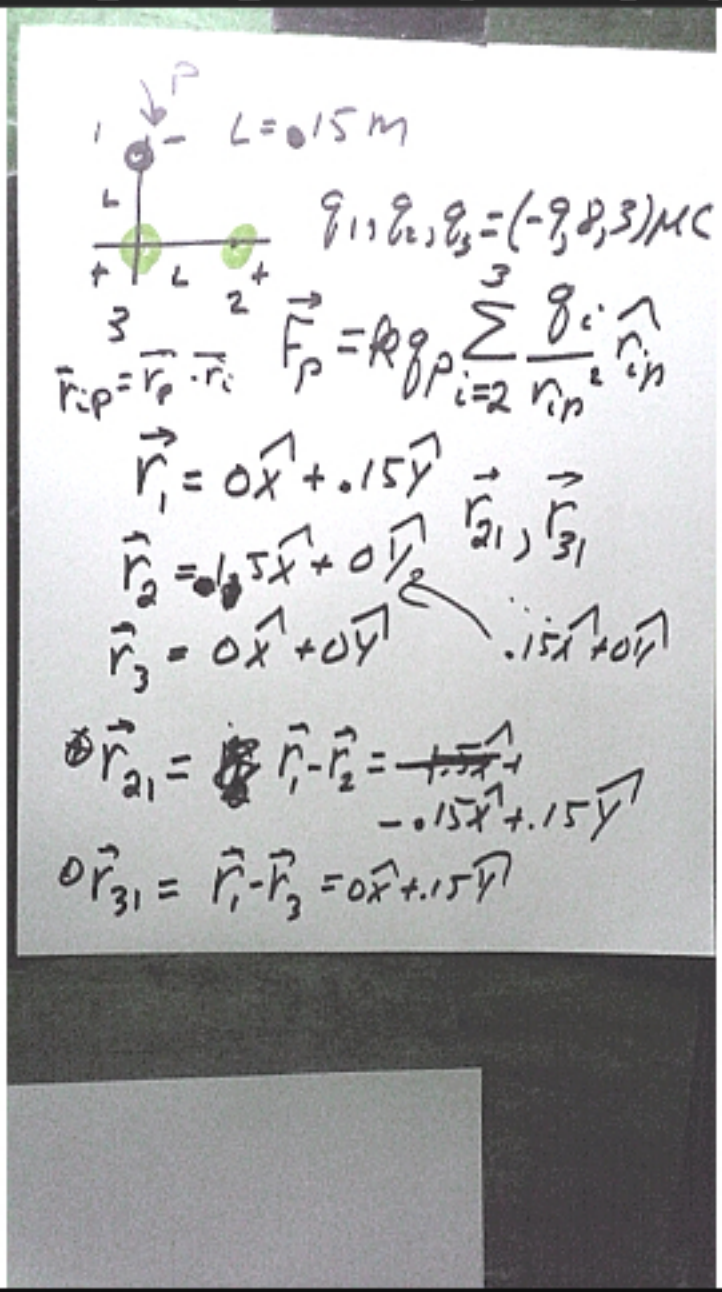

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$\vec{r}_3 = 0\hat{x} + 0\hat{y}$ $\quad .15\hat{x} + 0\hat{y}$

$$\vec{F}_1 = kq_1\left[\frac{\vec{r}_{21}}{r_{21}^{3/2}} + \frac{\vec{r}_{31}}{r_{31}^{3/2}}\right]$$

$$= kq_1\left[\frac{-.15\hat{x} + .15\hat{y}}{(.15^2 + .15^2)^{3/2}}(q_2) + \frac{0\hat{x} + .15\hat{y}}{(0^2 + .15^2)^{3/2}}(q_3)\right]$$

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$\vec{r}_3 = 0\hat{x} + 0\hat{y}$ $\quad .15\hat{x} + 0\hat{y}$

$\vec{r}_{21} = \vec{r}_1 - \vec{r}_2 = -.15\hat{x} + .15\hat{y}$

$$\vec{F}_1 = kq_1\left[\frac{\vec{r}_{21}}{r_{21}^{3/2}} + \frac{\vec{r}_{31}}{r_{31}^{3/2}}\right]$$

$$= kq_1\left[\frac{-.15\hat{x} + .15\hat{y}}{(.15^2 + .15^2)^{3/2}}(q_2) + \frac{0\hat{x} + .15\hat{y}}{(0^2 + .15^2)^{3/2}}(q_3)\right]$$

$q_2 = -9$, $q_3 = -9(8996)$

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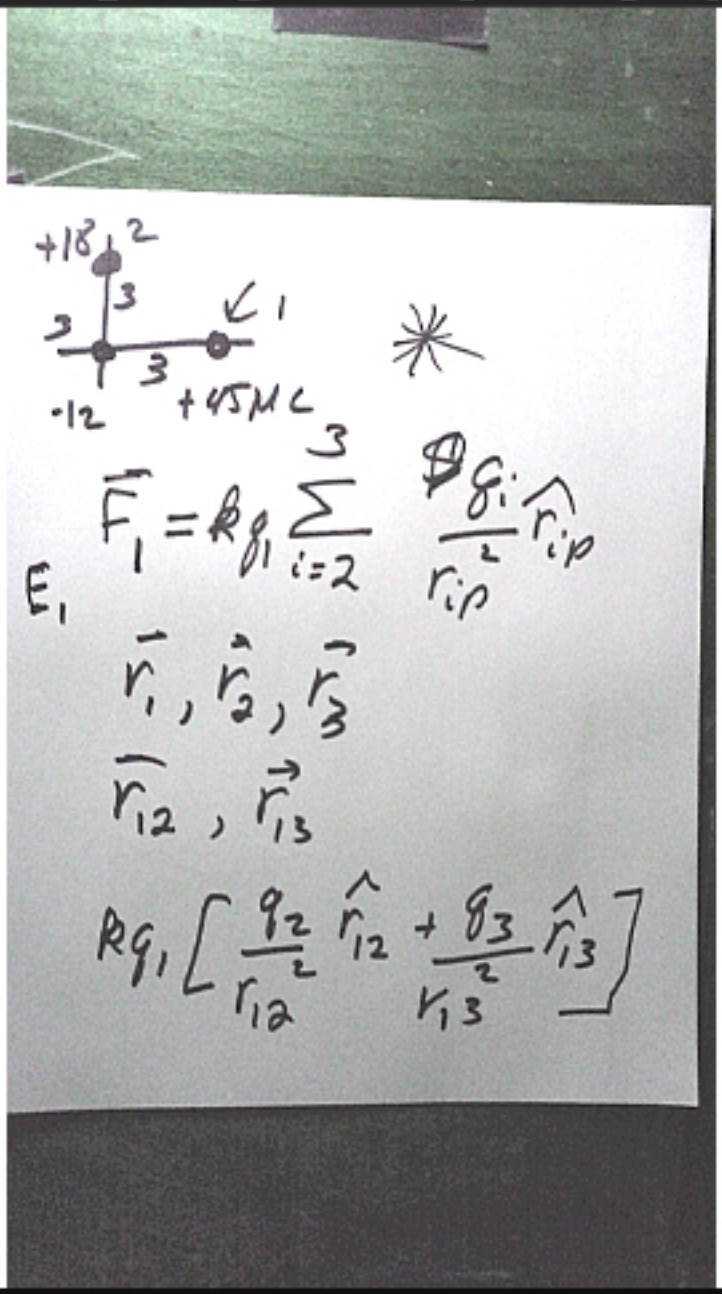

$$\vec{F}_1 = kq_1 \sum_{i=2}^{3} \frac{q_i}{r_{ip}^2} \hat{r}_{ip}$$

E_1

$\vec{r}_1, \vec{r}_2, \vec{r}_3$

$\vec{r}_{12}, \vec{r}_{13}$

$$kq_1 \left[\frac{q_2}{r_{12}^2} \hat{r}_{12} + \frac{q_3}{r_{13}^2} \hat{r}_{13} \right]$$

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