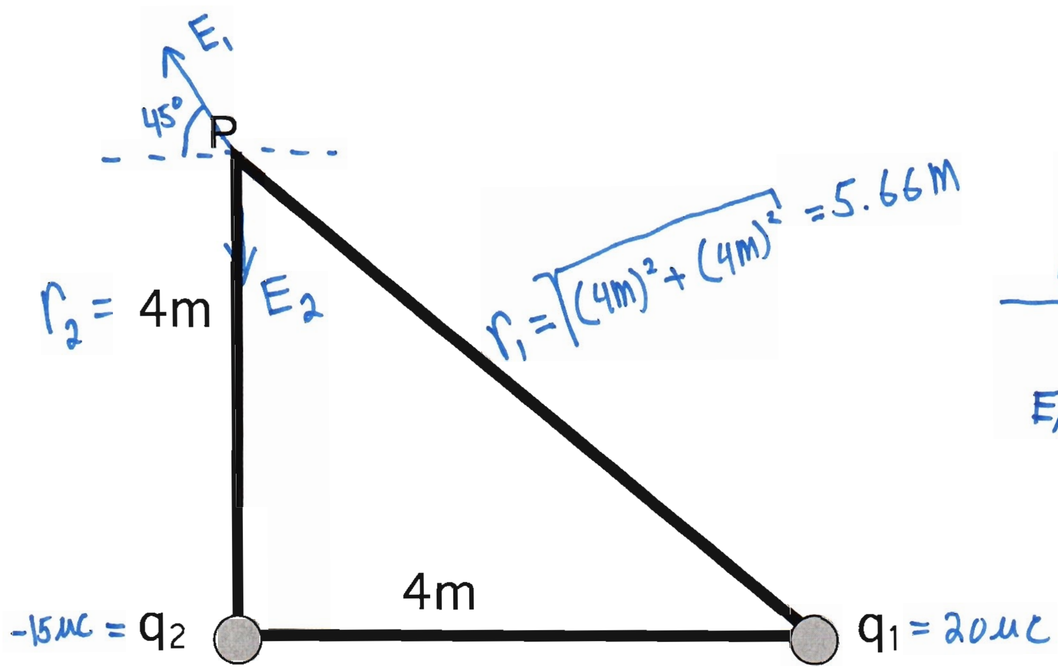
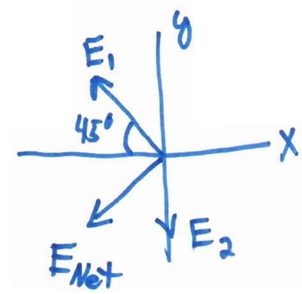
PHYS 1112
Introductory Physics II
Quiz 2

Name Charles John

Show all work in the spaces provided.





In the figure above $q_1=+20\ \mu C$ and $q_2=-15\ \mu C$.

Find the total electric field (magnitude and direction) at point P due to charges q_1 and q_2.

$$E_1 = k\frac{q_1}{r_1^2} = \left(9\times10^9 N\frac{m^2}{c^2}\right)\frac{(20\times10^{-6}C)}{(5.66m)^2} = 5.62\times10^3 N/c$$

$$E_2 = k\frac{q_2}{r_2^2} = \left(9\times10^9 N\frac{m^2}{c^2}\right)\frac{(15\times10^{-6}C)}{(4m)^2} = 8.44\times10^3 N/c$$

$$\Sigma E_x = -E_1 \cos(45^\circ) = (5.62\times10^3 N/c)\cos(45^\circ) = 3.97\times10^3 N/c$$

$$\Sigma E_y = E_1 \sin(45^\circ) - E_2 = (5.62\times10^3 N/c)\sin(45^\circ) - (8.44\times10^3 N/c)$$
$$= -4.47\times10^3 N/c$$

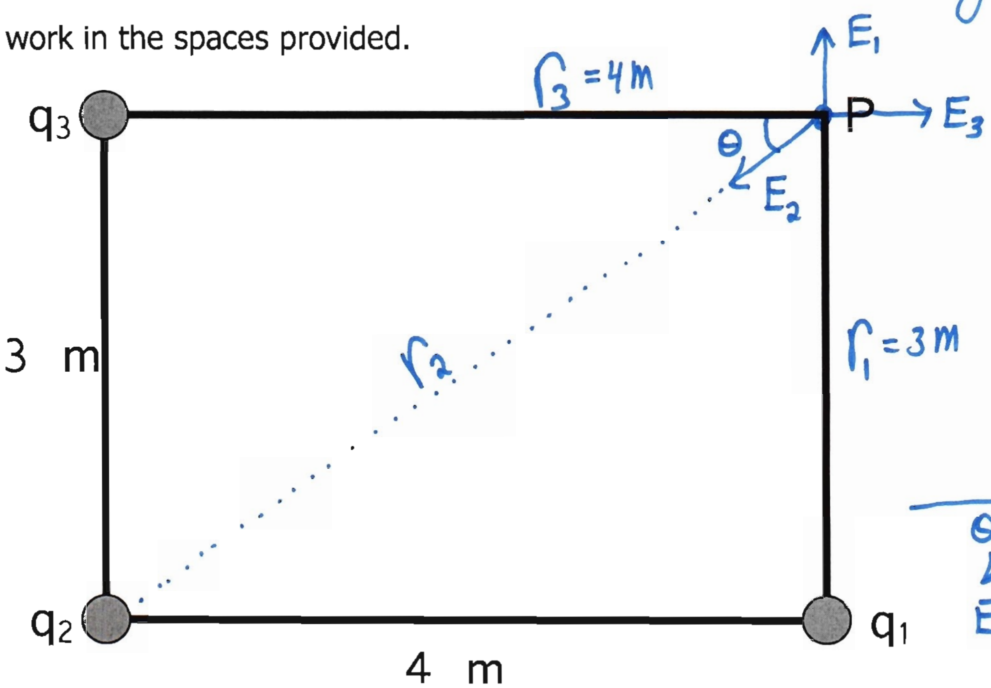
$$|E_{Net}| = \sqrt{(\Sigma E_x)^2 + (\Sigma E_y)^2} = 5.98\times10^3 N/c$$

$$\theta = \tan^{-1}\left(\frac{\Sigma E_y}{\Sigma E_x}\right) = -48.40$$

PHYS 2212
Principles of Physics II
Quiz 2

Name: Charles Johnson

Show all work in the spaces provided.

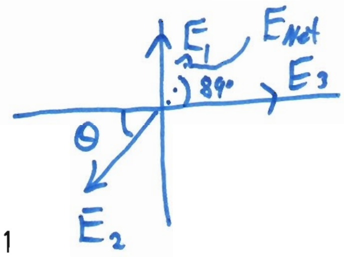


$r_2 = \sqrt{(3m)^2 + (4m)^2}$

$r_2 = 5m$

$\theta = \tan^{-1}\left(\frac{3m}{4m}\right)$

$\theta = 36.870° \approx 37°$



In the figure above $q_1=+20\ \mu C$, $q_2=-15\ \mu C$, and $q_3=8\ \mu C$.

Find the total electric field (magnitude and direction) at point P

$$E_1 = k\frac{q_1}{r_1^2} = \left(9\times10^9 N\frac{m^2}{c^2}\right)\frac{(20\times10^{-6}c)}{(3m)^2} = 2\times10^4 N/c$$

$$E_2 = k\frac{q_1}{r_1^2} = \left(9\times10^9 N\frac{m^2}{c^2}\right)\frac{(15\times10^{-6}c)}{(5m)^2} = 5.4\times10^3 N/c$$

$$E_3 = k\frac{q_3}{r_3^2} = \left(9\times10^9 N\frac{m^2}{c^2}\right)\frac{(8\times10^{-6}c)}{(4m)^2} = 4.5\times10^3 N/c$$

$$\Sigma E_x = E_3 - E_2\cos(37°) = 4.5\times10^3 N/c - (5.4\times10^3 N/c)\cos(37°) = 187.37 N/c$$

$$\Sigma E_y = E_1 - E_2\sin(37°) = 2.0\times10^4 N/c - (5.4\times10^3 N/c)\sin(37°) = 16750.2 N/c$$

$$|\vec{E}_{net}| = \sqrt{(\Sigma E_x)^2 + (\Sigma E_y)^2} = 16751.25 N/c$$

$$\theta = \tan^{-1}\left(\frac{\Sigma E_y}{\Sigma E_x}\right) = 89°$$