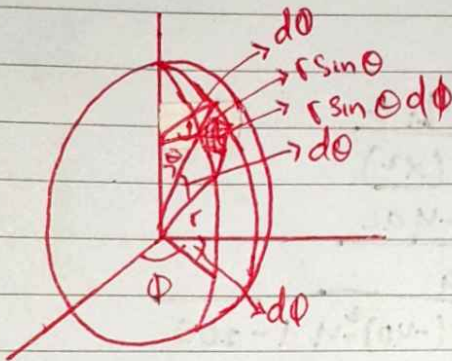


Kelistrikan dan Kemagnetan

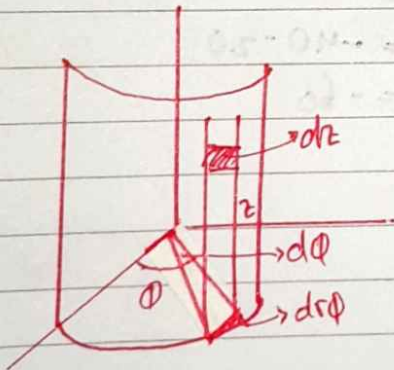


$$dV = dV \times dl$$

$$= \rho dV \cdot \rho \sin \theta d\phi$$

$$= r^2 \sin \theta d\theta d\phi$$

$$dV = r^2 \sin \theta d\theta d\phi dr$$



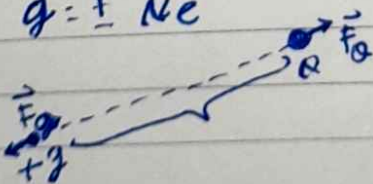
$$A = r d\theta dz$$

$$V = r d\phi dz dr$$

Medan Listrik

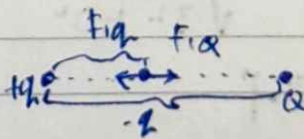
muatan listrik adalah

$$q = \pm Ne$$



$$\vec{E}_Q = \vec{E}_Q = \vec{E} \cdot \frac{1}{4\pi} \frac{qQ}{r^2} \vec{r}_0$$

$$\vec{r}_0 = \frac{\vec{r}}{|\vec{r}|}$$

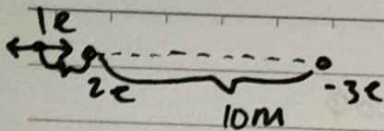


$$\vec{F}_{12} = \vec{F}_{12}$$

$$\frac{kq_1 q_2}{(r-x)^2} = k \frac{q_1 q_2}{(x^2)}$$

$$\frac{Q}{r^2 - 2rx + x^2} = \frac{q}{x^2}$$

$$Qx^2 = q(r^2 - 2rx + x^2)$$



$$f_{12} = f_{13}$$

$$\frac{k q_1 q_2}{x^2} = \frac{k q_1 q_3}{(10+x)^2}$$

$$\frac{2}{x^2} = \frac{3}{(10+x)^2}$$

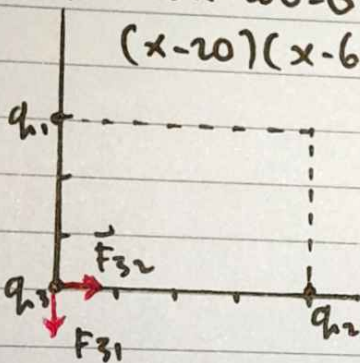
$$3x^2 = 2x^2 + 40x + 200$$

$$3x^2 - 2x^2 - 40x - 200 = 0$$

$$x^2 - 40x - 200 = 0$$

$$(x-20)(x-60)$$

$$(x-20)(x-60)$$



$$\vec{F}_{32} = k \frac{q_3 q_2}{4^2} \frac{(3\hat{i} + 0\hat{j})}{\sqrt{3^2 + 0^2}}$$

$$= k \frac{q_3 q_2}{16} \hat{i}$$

$$\vec{F}_{31} = k \frac{q_3 q_1}{3^2} (-\hat{j}) = -k \frac{q_3 q_1}{9} \hat{j}$$

$$\vec{F} = k q_3 \left[\frac{q_2}{16} \hat{i} - \frac{q_1}{9} \hat{j} \right]$$

$$|\vec{F}| = k q_3 \sqrt{\left(\frac{q_2}{16}\right)^2 + \left(\frac{q_1}{9}\right)^2}$$

$$f_{q_1} \cdot f_{q_2}$$

$$\frac{k q_1 q_2}{(r+x)^2} = \frac{k q_1 q_3}{(x^2)}$$

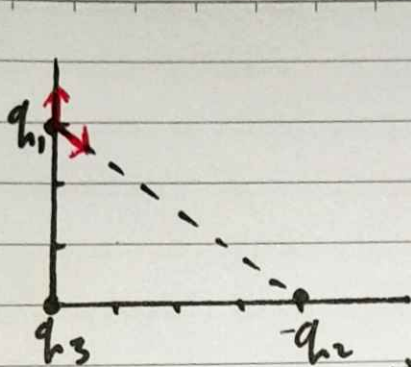
$$x = b \pm \sqrt{b^2 - 4ac}$$

$$= (-40) \pm \sqrt{(-40)^2 - 4(1)(-200)}$$

$$= -40 \pm \sqrt{1600 + 800}$$

$$= -40 \pm 20$$

$$= -20 \quad = -60$$

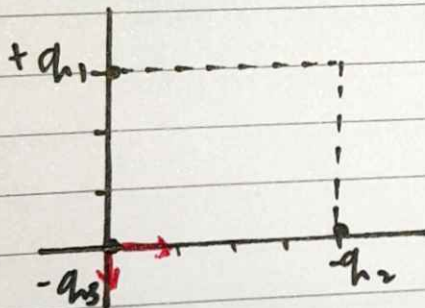


$$\vec{F}_{13} = k \frac{q_1 q_3}{3^2} \hat{j}$$

$$\vec{F}_{12} = k \frac{q_1 q_2}{5^2} (4\hat{i} - 3\hat{j})$$

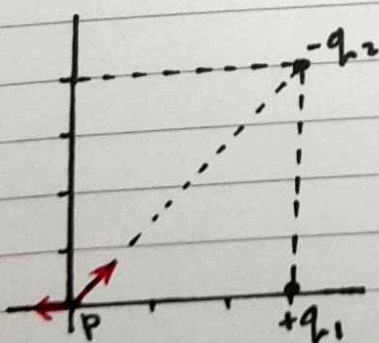
$$= 4k \frac{q_1 q_2}{125} \hat{i} - 3k \frac{q_1 q_2}{125} \hat{j}$$

$$\vec{F} = kq_1 \left[\left(\frac{4q_2}{125} \right) \hat{i} + \left(\frac{q_3}{9} - \frac{3q_2}{125} \right) \hat{j} \right]$$



$$\vec{E}_{q_3} = \frac{F_{2,3}}{-q_3} = \frac{k q_3 q_2}{r^2}$$

$$F = k \frac{q}{r^2} \vec{r}_x$$



$$\vec{E}_1 = k \frac{q_1}{3^2} (-\hat{i})$$

$$= k \frac{q_1}{9} \hat{i}$$

$$\vec{E}_2 = k \frac{q_2}{5^2} \left(\frac{3\hat{i} + 4\hat{j}}{5} \right)$$

$$= 3k \frac{q_2}{125} \hat{i} + 4k \frac{q_2}{125} \hat{j}$$

$$\vec{E} = k \left[\left(\frac{3q_2}{125} - \frac{q_1}{9} \right) \hat{i} + \frac{4q_2}{125} \hat{j} \right]$$