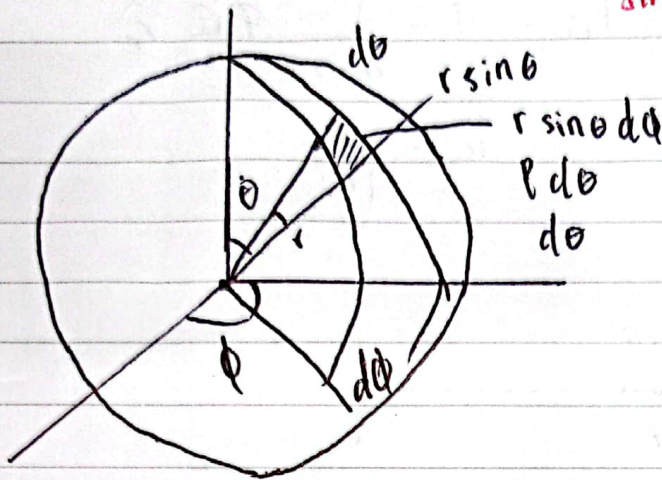




$$\sin \theta = \frac{x}{r}$$

$$x = r \sin \theta$$

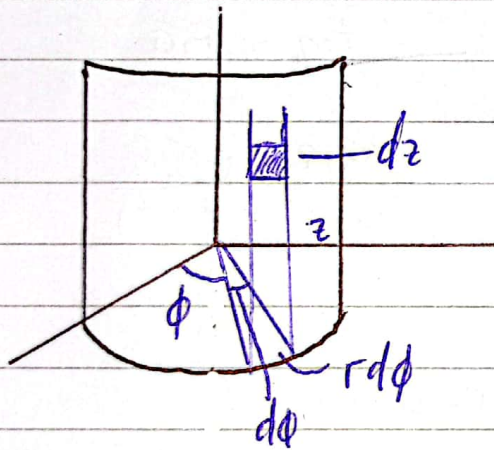
$$A = \int_0^\pi \int_0^{2\pi} r^2 \sin \theta d\theta d\phi$$

$$da = dp \times dl$$

$$= r d\theta \cdot r \sin \theta d\phi$$

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

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



$$A = r d\phi dz$$

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

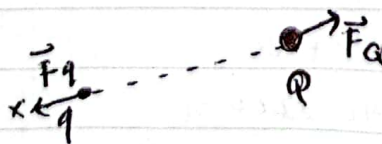
• Gaya Listrik

> Muatan Listrik

$$Q = \pm N e$$

→ bisa diambil
dr kelebihan/kekurangan
proton/elektron

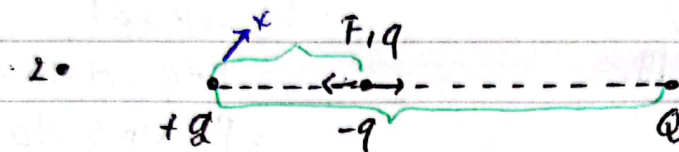
Contoh: 1.



Gaya akan sama
akan tetapi percepatannya
berbeda

$$\vec{F}_q = \vec{F}_Q = \vec{F} = \frac{1}{4\pi\epsilon_0} \frac{qQ}{r^2} \hat{r}$$

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



$$Q > q$$

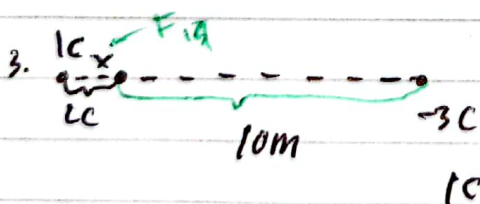
$$\vec{F}_{1q} = F_{1q}$$

$$-q, +q$$

$$\frac{kq_1Q}{(r-x)^2} = k \frac{q_1q}{(x^2)}$$

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

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



$$\vec{F} = F_{13}$$

$$k \frac{q_1Q}{(r+x)^2} = k \frac{q_1q}{(x)^2}$$

$$k \frac{1 \cdot 2}{x^2} = k \frac{1 \cdot 3}{(10+x)^2}$$

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

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

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

$$= -40 + \sqrt{2400}$$

$$= -40 + 20 = -20$$

$$= -20 = -60$$

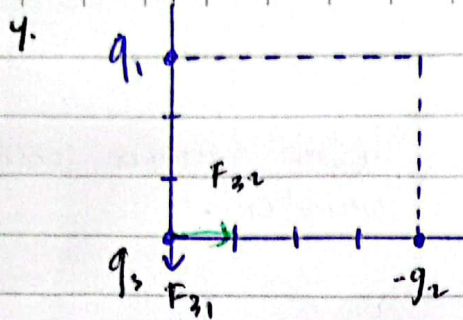
$$\frac{2}{x^2} = \frac{3}{(10+x)^2}$$

$$2x^2 = 3(10+x)^2$$

$$2x^2 = 3(100 + 20x + x^2)$$

$$2x^2 = 300 + 60x + 3x^2$$

$$1x^2 - 60x - 300 = 0$$



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

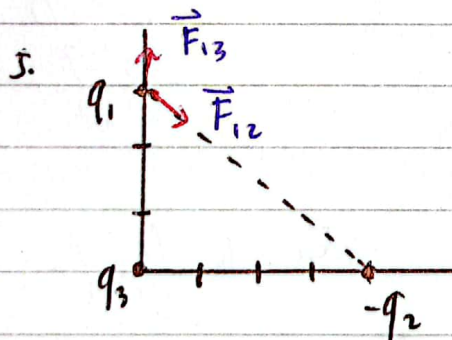
$$= k \frac{q_3 \cdot q_2}{16} \hat{i}$$

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

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

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

$$= k \frac{23 \cdot 21}{9} \hat{j}$$

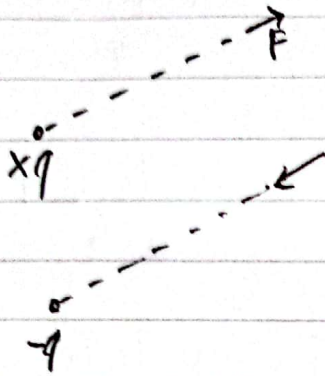


$$\vec{F}_{13} = k \frac{q_1 \cdot q_3}{3^2} \hat{j}$$

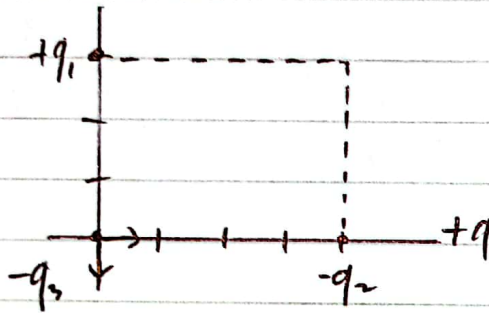
$$\vec{F}_{12} = k \frac{q_1 \cdot q_2}{5^2} \left(\frac{4\hat{i} - 3\hat{j}}{5} \right)$$

$$\vec{F} = k q_1 \left[\left(\frac{4q_2}{125} \right) \hat{i} + \left(\frac{q_3}{9} - \frac{3q_2}{125} \right) \hat{j} \right] = 4k \frac{q_1 \cdot q_2}{125} \hat{i} - 3k \frac{q_1 \cdot q_2}{125} \hat{j}$$

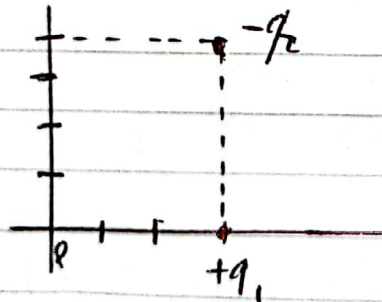
Medan Listrik



Medan hanya satu muatan.



$$\begin{aligned}\vec{E}_{q_3} &= \frac{F_{32}}{-q_3} \\ &= k \frac{q_3 q_2 / r^2}{q_3} \hat{j} \\ F &= k \frac{q}{r^2} \hat{j}\end{aligned}$$



$$\begin{aligned}\vec{E}_1 &= k \frac{q_1}{3^2} (-\hat{j}) \\ &= k \frac{q_1}{9} \hat{j}\end{aligned}$$

$$\begin{aligned}\vec{E} &= k \left[\left(\frac{3q_2}{125} - \frac{q_1}{9} \right) \hat{i} + \frac{4q_2}{125} \hat{j} \right] \\ \vec{E}_2 &= k \frac{q_2}{5^2} \left(\frac{3\hat{i} + 4\hat{j}}{5} \right) \\ &= 3k \frac{q_2}{125} \hat{i} + 4k \frac{q_2}{125} \hat{j}\end{aligned}$$