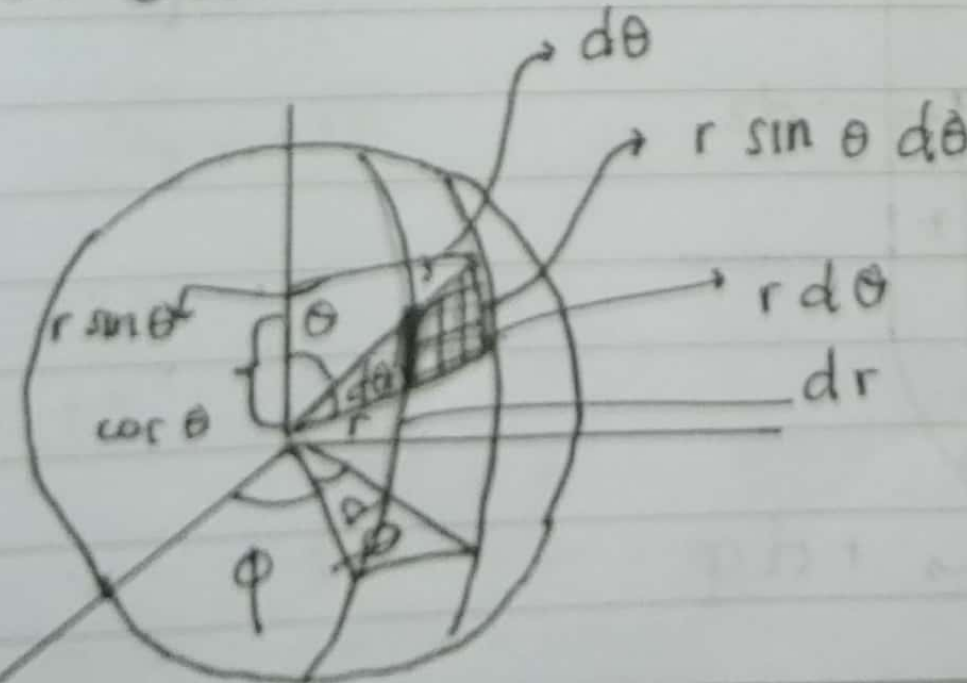


4.3.2024

Koordinat Bola



sudut terhadap sin
berlawanan cos

$$A = P \times L$$

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

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

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

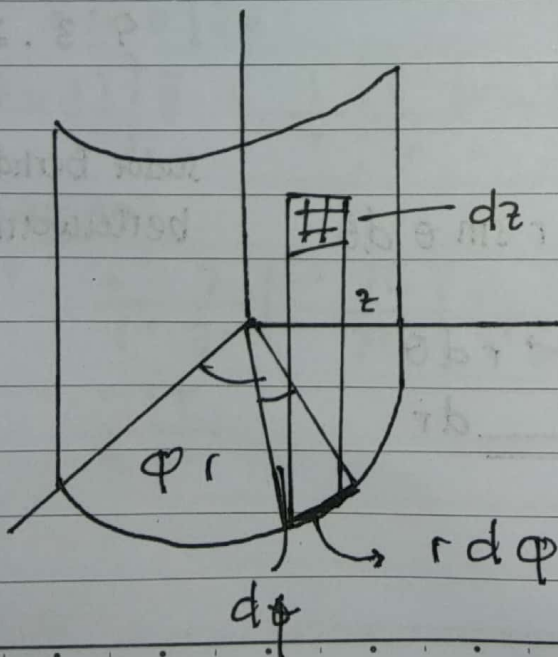
$$A = \int_0^{2\pi} \int_0^\pi r^2 \sin \theta d\theta d\phi = 4\pi r$$

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

$$= 4\pi r^2$$

$$V = \int_0^r \int_0^{2\pi} \int_0^\pi$$

► Koordinat Silinder



$$A = r d\phi dz$$

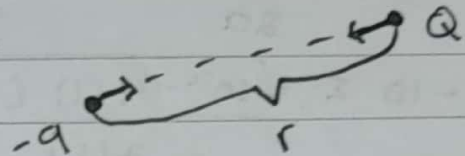
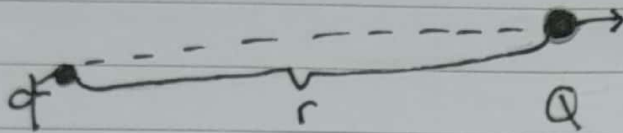
$$V = r d\phi dz dr$$

Listrik Statis

ex: Petir (melepaskan muatan ke bumi)

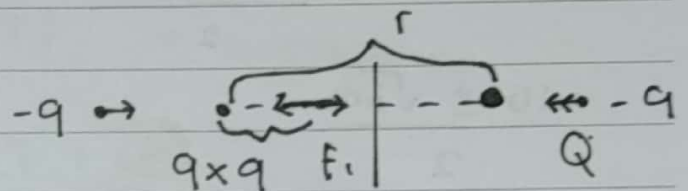
$$q = \pm ne$$

berlawanan



$$\vec{F} = \frac{1}{4\pi\epsilon_0} \frac{qQ}{r^2} \hat{r}_0$$

Permittifitas

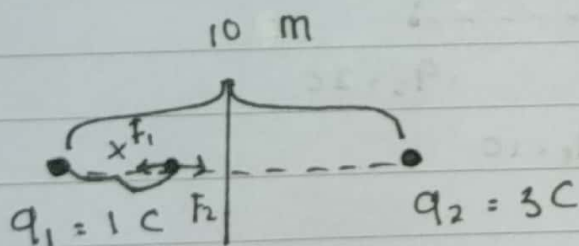


$$\vec{F}_1 = \vec{F}_2$$

$$Q > q$$

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

contoh :



$$q_3 = -2C$$

$$\vec{F}_1 = \vec{F}_2$$

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

$$\frac{1}{x^2} = \frac{3}{(10-x)^2}$$

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

$$100 - 20x + x^2 = 3x^2$$

$$100$$

$$100$$

$$0 = 2x^2 + 20x - 100$$

$$0 = x^2 + 10x - 50$$

$$a = 1 \quad b = 10 \quad c = -50$$

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

$$= \frac{-10 \pm \sqrt{10^2 - 4(1)(-50)}}{2(1)}$$

$$= \frac{-10 \pm \sqrt{100 + 200}}{2}$$

$$= \frac{-10 \pm \sqrt{300}}{2}$$

$$x = \frac{-10 + 10\sqrt{3}}{2}$$

$$x = \frac{-10 - 10\sqrt{3}}{2}$$

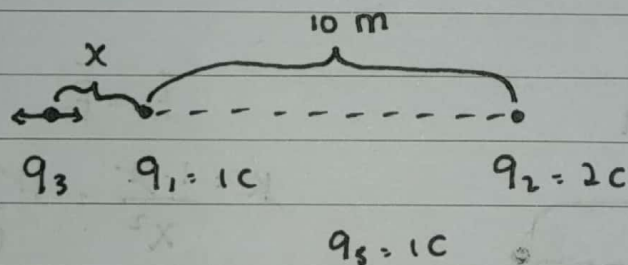
$$x = -5 + 5\sqrt{3}$$

$$= -13.66$$

$$x = -5 - 5\sqrt{3}$$

$$= 3.66$$

Contoh:



$$F_1 = F_2$$

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

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

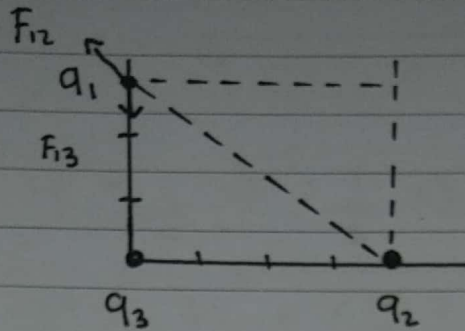
$$2x^2 = (10+x)^2$$

$$2x^2 = 100 + x^2 + 20x$$

$$2x^2 - x^2 - 20x - 100 = 0$$

$$x^2 - 20x - 100 = 0 \rightarrow \text{lanjut pake rumus abc}$$

contoh :



$$F_{13} = K \frac{q_1 q_3}{3^2} (-\hat{j}) \rightarrow \text{asalnya dr}$$

$$F_{12} = K \frac{q_1 q_2}{5^2} \left(\frac{-4\hat{i} + 3\hat{j}}{5} \right)$$