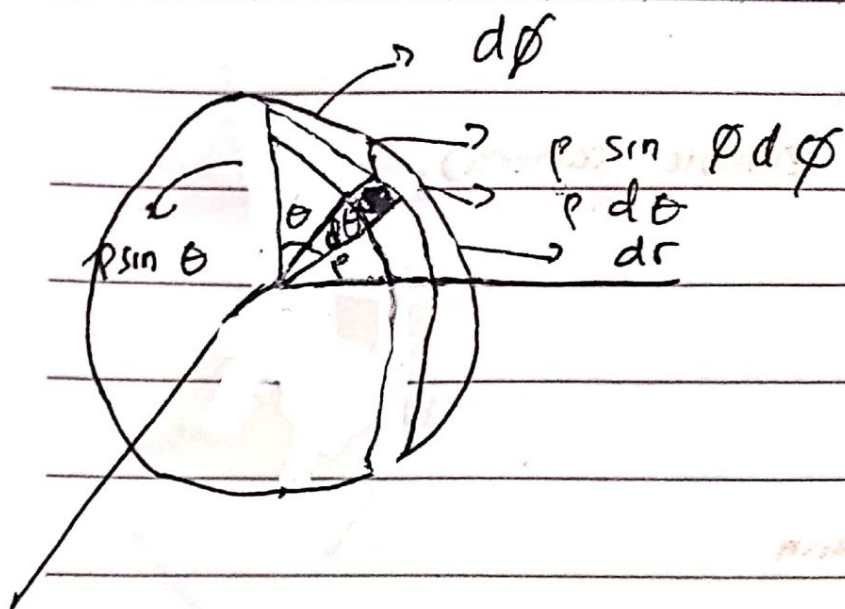




$$A = r \times l$$

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

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

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

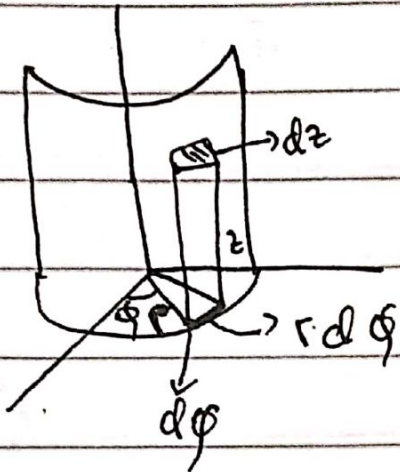
$$A = \int_0^{2\pi} \int_0^{\pi} r^2 \sin \theta d\theta d\phi = 4\pi r$$

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

$$= 4\pi r^2$$

$$V = \int_0^r \int_0^{\pi} \int_0^{2\pi} r^2 \sin \theta d\theta dr$$

$$= \frac{4}{3} \pi r^3$$



$$A = r d\phi dz$$

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

Electric Statics



$$F = \frac{1}{4\pi\epsilon_0}$$

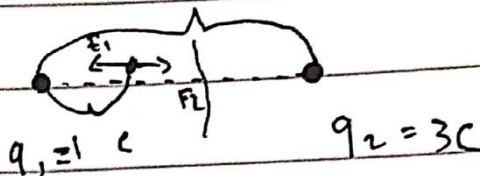
$$\frac{qQ}{r^2}$$



$$F_1 = F_2$$

Electric Statics merupakan listrik dengan muatan dalam keadaan diam atau statis, berbeda dengan listrik dinamis yang muatan listriknya senantiasa bergerak. Secara matematis, listrik jenis statis merupakan ketidakseimbangan muatan listrik dalam atau di permukaan benda.

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

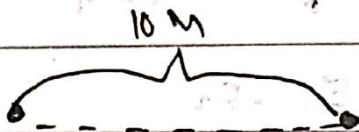


$$q_3 = -2C$$

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

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

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



$$-q_1 = 1C$$

$$q_2 = 2C$$

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

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

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

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

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

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

$$(x+15)(x-5) = 0$$

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

$$2a$$

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

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

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

$$= \frac{10 \sqrt{3} - 10}{-5 \cdot 1,7 - 5}$$

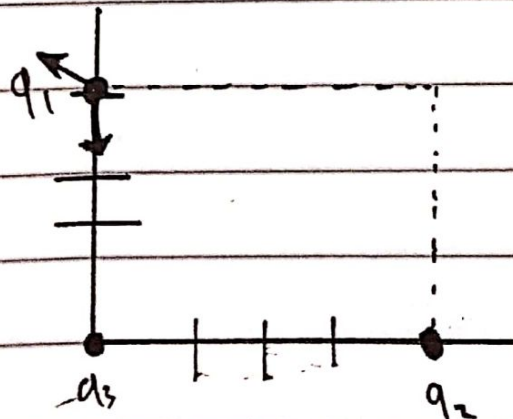
$$= \frac{-10 \pm \sqrt{300}}{2} \quad 3,600$$

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

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

$$-5 - 5 \cdot 1,7 = 13,5$$

Contoh:



$$F_{13} = k \frac{q_1 q_3}{r^2} (-\hat{j})$$

$$F_{12} = k \frac{q_1 q_2}{r^2} \left(\frac{-9\hat{i} + 3\hat{j}}{5} \right)$$

$$= \frac{-60\hat{i} - 3\hat{j}}{\sqrt{10^2 + 3^2}}$$