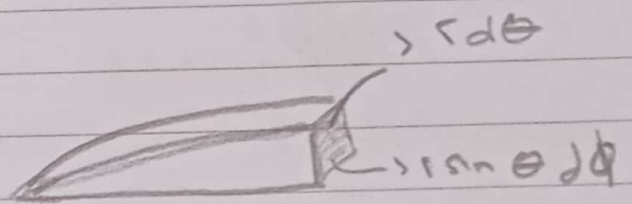
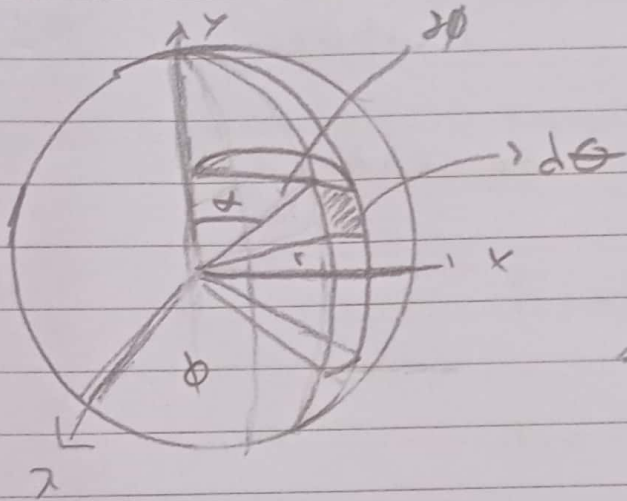


Kalkulus

Lintang Nimos k
2213022057

Sistem koordinat

1. Sistem Koordinat bola



$$\begin{aligned} dA &= d\theta \times d\phi \\ &= r d\theta \cdot r \sin\theta d\phi \\ &= r^2 \sin\theta d\theta d\phi \end{aligned}$$

$$\begin{aligned} dV &= dr \times d\theta \times d\phi \\ &= r^2 \sin\theta dr d\theta d\phi \end{aligned}$$

$$\nabla T = \hat{i} \frac{\partial T}{\partial x} + \hat{j} \frac{\partial T}{\partial y} + \hat{k} \frac{\partial T}{\partial z}$$

$$\nabla T = \hat{i}$$

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

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

$$= 2\pi r^2 \int_0^\pi \sin\theta d\theta$$

$$= 2\pi r^2 \int_0^\pi -\cos\theta d\theta$$

$$= 4\pi r^2$$

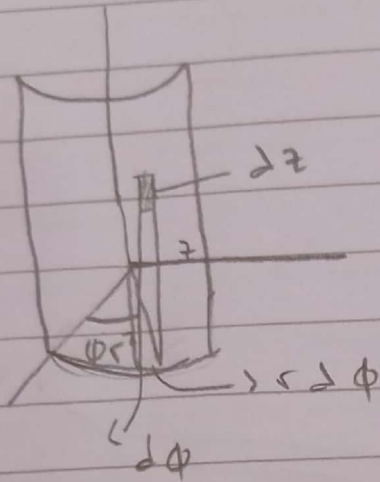
$$A = \int_0^\pi \int_0^{2\pi} \int_0^r r^2 \sin\theta dr d\theta d\phi$$

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

$$= 2(\pi^2) \int_0^r r^2 dr$$

$$= 4\pi \left(\frac{1}{3} r^3 \right)$$

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

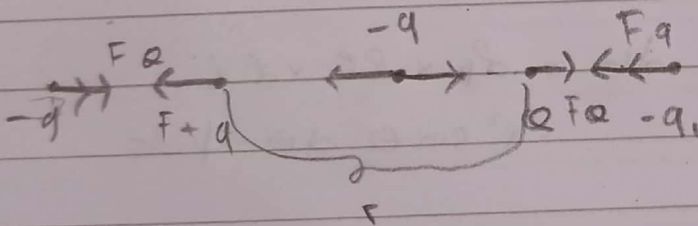


$$dA = dr \times dz$$

$$= r d\phi dz$$

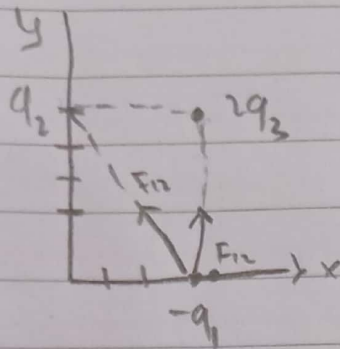
$$dv = r d\phi dz dr$$

$$Q = \pm Ne$$



$$a = \frac{F}{m}$$

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

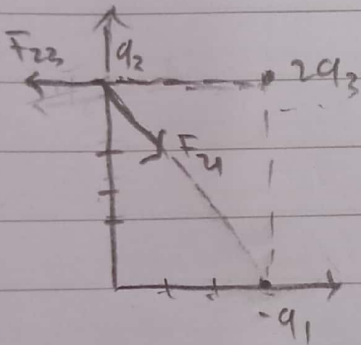


$$F_{12} = k \frac{q_1 (2q_3)}{4^2}$$

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

$$F = k q_1 \left[-\frac{3q_2}{125} \hat{i} + \left(\frac{2q_3}{16} + \frac{4q_2}{125} \right) \hat{j} \right]$$

$$|F| =$$



$$F_{21} = k \frac{q_2 q_1}{5^2} (-2\hat{i} + 4\hat{j})$$

$$F_{23} = \frac{3k q_2 q_1}{125} \hat{i} - \frac{4k q_2 q_1}{125} \hat{j}$$

$$\begin{aligned} F_{23} &= -k \frac{q_2 (2q_3)}{3^2} \hat{i} \\ &= \frac{2k q_2 q_3}{9} \hat{i} \end{aligned}$$