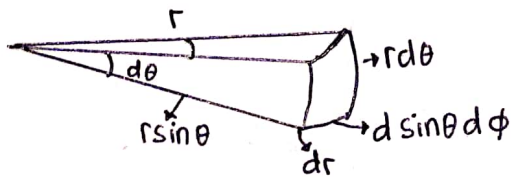
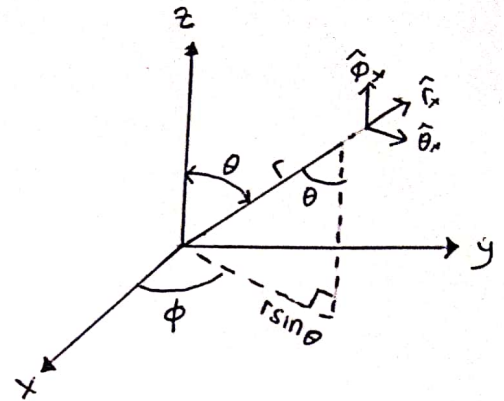
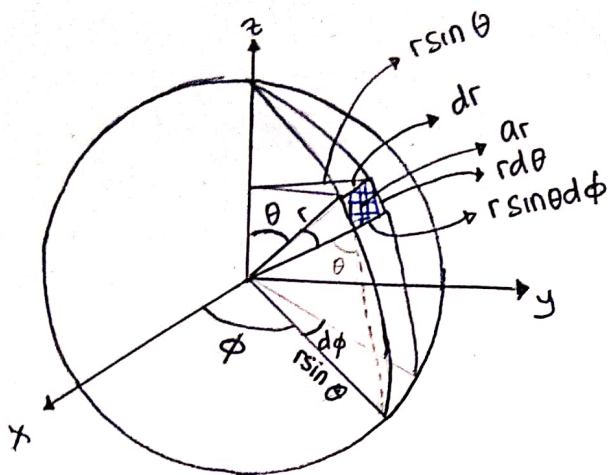


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Koordinat Bola

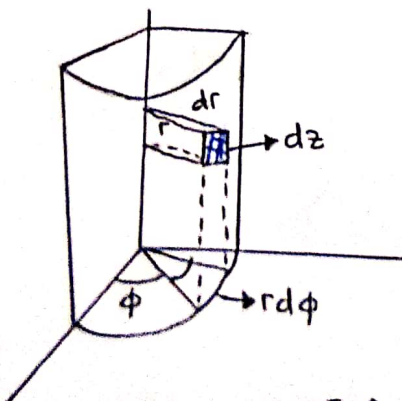


$$\begin{aligned}\text{Luas} &= P \times l \\ &= r \sin \theta d\phi \cdot d\theta \\ &= r^2 \sin \theta d\theta d\phi\end{aligned}$$

$$\begin{aligned}\text{Volume} &= P \times l \times t \\ &= r \sin \theta d\phi \cdot r d\theta \cdot dr \\ &= r^2 \sin \theta d\theta dr d\phi\end{aligned}$$

$$\begin{aligned}\text{Gradien: } \nabla t &= \hat{r} \frac{\partial t}{\partial r} + \hat{\theta} \left(\frac{1}{r} \frac{\partial t}{\partial \theta} \right) + \hat{\phi} \left(\frac{1}{r \sin \theta} \frac{\partial t}{\partial \phi} \right) \\ \text{Divergensi: } \nabla \cdot \mathbf{V} &= \frac{1}{r^2} \frac{\partial}{\partial r} (r^2 V_r) + \frac{1}{r \sin \theta} \frac{\partial}{\partial \theta} (\sin \theta V_\theta) \\ &\quad + \frac{1}{r \sin \theta} \frac{\partial}{\partial \phi} (V_\phi)\end{aligned}$$

Koordinat Silinder (r, theta, z)



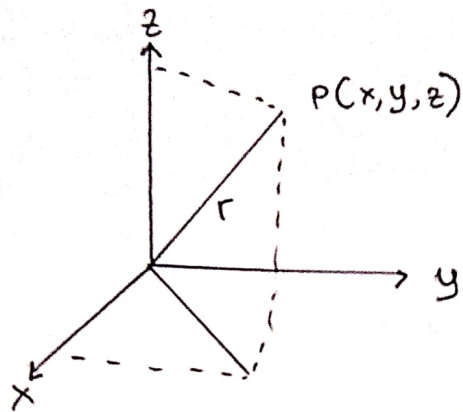
$$\text{Luas} = r d\theta \cdot dz$$

$$\text{Volume} = dr \cdot r d\theta \cdot dz$$

$$\text{Gradien: } \nabla T = \frac{\partial T}{\partial r} \hat{r} + \frac{1}{r} \frac{\partial T}{\partial \theta} \hat{\theta} + \frac{\partial T}{\partial z} \hat{z}$$

$$\text{Divergensi: } \nabla \cdot \mathbf{V} = \frac{1}{r} \frac{\partial}{\partial r} (r V_r) + \frac{1}{r} \frac{\partial V_\theta}{\partial \theta} + \frac{\partial V_z}{\partial z}$$

koordinat kartesian (x, y, z)



$$\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$$

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

$$|\vec{r}| = \sqrt{x^2 + y^2 + z^2}$$