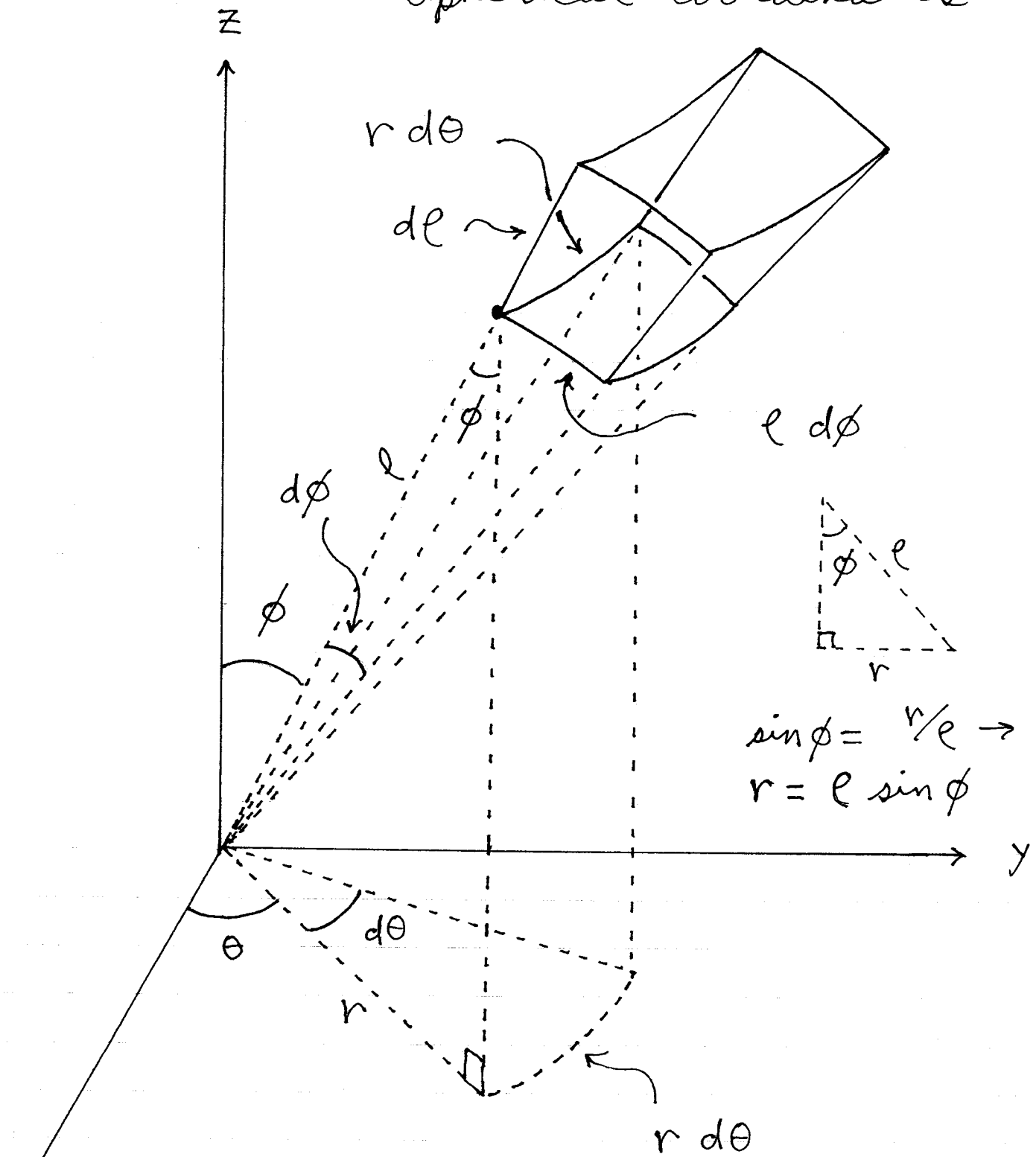


Math 21C

Kouba

# The Differential of Volume for Spherical Coordinates



$$\sin \phi = \frac{r}{e} \rightarrow r = e \sin \phi$$

$$\begin{aligned} dV &= (de)(e d\phi)(r d\theta) \\ &= (de)(e d\phi)(e \sin \phi d\theta) \\ &= e^2 \sin \phi de d\phi d\theta \end{aligned}$$