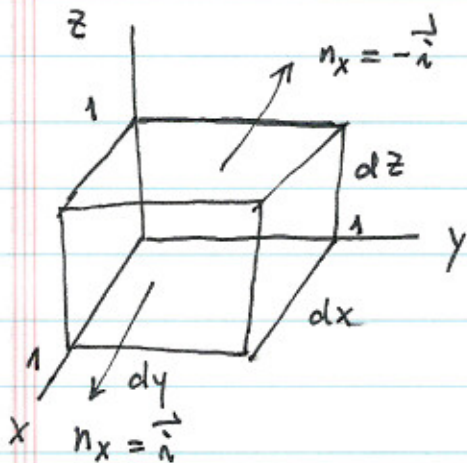


# Home work



$$\frac{1}{3} \int_S \vec{r} \cdot d\vec{\sigma} = \frac{1}{3} \int x d\sigma|_x + \frac{1}{3} \int y d\sigma|_y + \frac{1}{3} \int z d\sigma|_z$$

$$d\vec{\sigma}|_{x \text{ component}} = dy dz$$

so the x components are

$$\begin{aligned} & \frac{1}{3} \int (-x=0) dy dz + \frac{1}{3} \int (x=1) dy dz \\ &= 0 + \frac{1}{3} \int_0^1 dy \int_0^1 dz = \frac{1}{3} \end{aligned}$$

The same argument applies to y and z components

$$\text{so } \frac{1}{3} \int_S \vec{r} \cdot d\vec{\sigma} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 1$$