

Oppgave 43

La $g(y) = (r^2 - y^2)^{\frac{1}{2}}$. Da er

$$\begin{aligned} A &= 2\pi \int_{-\frac{h}{2}}^{\frac{h}{2}} g(y) \sqrt{1 + \dot{g}^2(y)} \, dy \\ &= 4\pi \int_0^{\frac{h}{2}} (r^2 - y^2)^{\frac{1}{2}} \frac{r}{\sqrt{r^2 - y^2}} \, dy \\ &= 4\pi r \int_0^{\frac{h}{2}} y \, dy \\ &= 4\pi r [y]_0^{\frac{h}{2}} \\ &= 2\pi r h \end{aligned}$$