



$$f(x) = \sqrt{r^2 - x^2}$$

~ dann ist

$$f'(x) = \frac{-x}{\sqrt{r^2 - x^2}}$$

↳

$$\sqrt{1 + [f'(x)]^2} = \sqrt{\frac{r^2}{r^2 - x^2}} = \frac{r}{\sqrt{r^2 - x^2}}$$

Zudem

$$\begin{aligned} |S_k| = |S| &= 2\pi \cdot \int_{-r}^r \sqrt{r^2 - x^2} \cdot \frac{r}{\sqrt{r^2 - x^2}} dx = 2\pi r \cdot \int_{-r}^r 1 dx = \\ &= 2\pi r \cdot (r + r) = \underline{\underline{4\pi r^2}} \end{aligned}$$