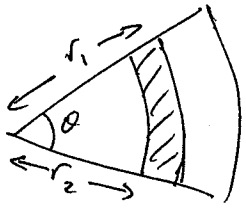


What is area of annular strip?

$$\text{Area}_{\text{strip}} = \text{Area}_{\text{wedge}_1} - \text{Area}_{\text{wedge}_2}$$

So what is area of wedge?

Area of circle $= \pi r^2$

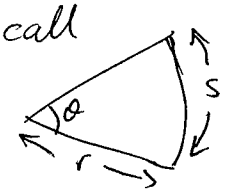
so area of wedge = fraction of πr^2 proportional to θ

$$= \left(\frac{\theta}{2\pi}\right)\pi r^2$$

$$= \frac{\theta}{2} r^2$$

$$\Rightarrow \text{Area of strip} = \frac{\theta}{2}\left[r_1^2 - r_2^2\right] = \frac{\theta}{2}(r_1 - r_2)(r_1 + r_2)$$

Recall



Arc length $s = r\theta$

so Area $= (r_1 - r_2)\,\dfrac{r_1\theta + r_2\theta}{2}$

$$= (r_1 - r_2)\,\frac{s_1 + s_2}{2}$$

$$= L\left(\frac{s_1 + s_2}{2}\right)$$