

Rechthoek in ovaal

7. $AB = 2 \cos \alpha + 2$

$AD = 2 \sin \alpha$

$$\begin{aligned} O &= AB \cdot AD = (2 \cos \alpha + 2) \cdot 2 \sin \alpha = 2 \cdot 2 \sin \alpha \cos \alpha + 4 \sin \alpha \\ &= 2 \sin 2\alpha + 4 \sin \alpha \end{aligned}$$

8. $O = 2 \sin 2\alpha + 4 \sin \alpha$

$$\begin{aligned} \frac{dO}{d\alpha} &= 2 \cdot 2 \cos 2\alpha + 4 \cos \alpha = 4 \cos 2\alpha + 4 \cos \alpha = 4 \cdot (\cos 2\alpha + \cos \alpha) = \\ &= 4 \cdot (2 \cos(\frac{1}{2}(2\alpha + \alpha)) \cdot \cos(\frac{1}{2}(2\alpha - \alpha))) = \\ &= 4 \cdot (2 \cos \frac{1}{2} \alpha \cdot \cos \frac{1}{2} \alpha) = \\ &= 8 \cdot \cos \frac{1}{2} \alpha \cdot \cos \frac{1}{2} \alpha \end{aligned}$$

9. Maximale oppervlakte $\rightarrow \frac{dO}{d\alpha} = 0$

$$8 \cdot \cos \frac{1}{2} \alpha \cdot \cos \frac{1}{2} \alpha = 0$$

$$\cos \frac{1}{2} \alpha = 0 \quad \vee \quad \cos \frac{1}{2} \alpha = 0$$

$$\frac{1}{2} \alpha = \frac{1}{2} \pi + k \cdot \pi \quad \vee \quad \frac{1}{2} \alpha = \frac{1}{2} \pi + k \cdot \pi$$

$$\alpha = \frac{1}{3} \pi + k \cdot \frac{2}{3} \pi \quad \vee \quad \alpha = \pi + k \cdot 2\pi$$

op $0 < \alpha < \frac{1}{2} \pi \quad \alpha = \frac{1}{3} \pi$

$$O = 2 \sin 2 \cdot \frac{1}{3} \pi + 4 \sin \frac{1}{3} \pi = 2 \cdot \frac{1}{2} \sqrt{3} + 4 \cdot \frac{1}{2} \sqrt{3} = 3\sqrt{3}$$