

Aufgabe 3. Bereiche

a) $A = \pi r^2$

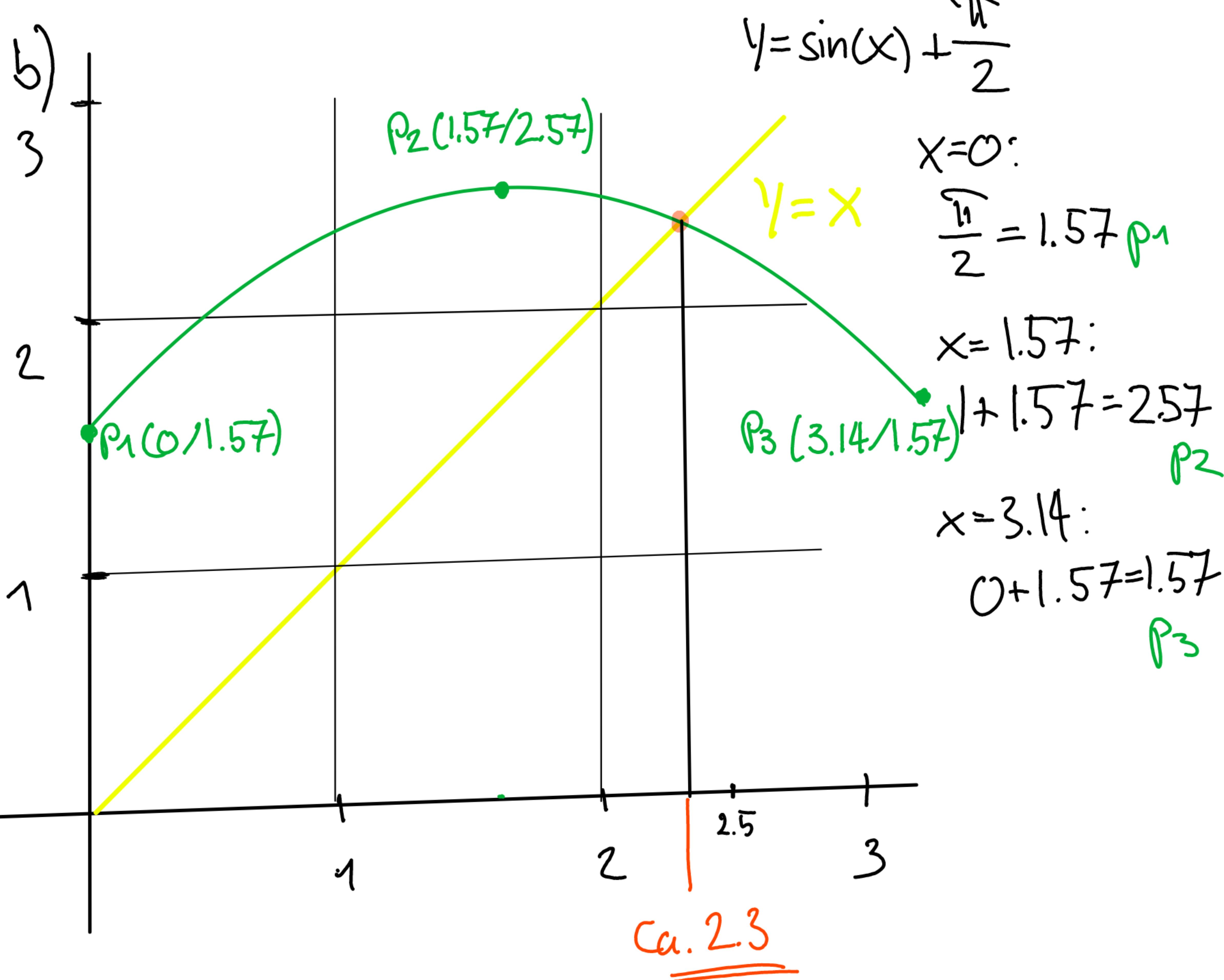
$$\text{gefüllt} = \frac{3}{4} \pi r^2 \quad \text{leer} = \frac{1}{4} \pi r^2$$

$$A_{\text{seg}} = r^2 \frac{1}{2} (\vartheta - \sin \vartheta) \quad \text{gleich leer}$$

$$r^2 \frac{1}{2} (\vartheta - \sin \vartheta) = \frac{1}{4} \pi r^2 \quad \text{ergibt gesuchte Gleichung}$$

$$2(\vartheta - \sin \vartheta) = \pi$$

$$\vartheta - \sin \vartheta = \frac{\pi}{2} \rightarrow \cdot (-1) = \sin \vartheta - \vartheta = -\frac{\pi}{2}$$



$$b) F(\alpha) = \sin \alpha + \frac{\pi}{2}$$

$$\alpha = 2 \rightarrow 2 - 0.909297 = 1.090703 < \frac{\pi}{2}$$

$$\alpha = 2.5 \rightarrow 2.5 - 0.59847 = 1.90153 > \frac{\pi}{2}$$

Intervall $[2, 2.5]$

$$f'(\alpha) = \cos \alpha \quad \cos 2 \text{ & } \cos 2.5 \leq 1 \text{ erfüllt}$$

$$\text{Für } F(\alpha) = 2.2 \rightarrow 0.80845 + \frac{\pi}{2} = 2.3792927\dots$$

$$c) h = 2r - y \xrightarrow{\text{Einsetzen}}$$

$$\cos \alpha = \frac{r-y}{r}$$

$$y = r - (r-y)$$

$$y = r - r \cos \frac{\alpha}{2} = r \left(1 - \cos \frac{\alpha}{2}\right)$$

$$\cos \frac{\alpha}{2} \cdot r = (r-y) \rightarrow h = 2r - r \left(1 - \cos \frac{\alpha}{2}\right)$$

$$2r - r + r \cdot \cos \frac{\alpha}{2}$$

$$h = r + r \cos \frac{\alpha}{2} = \underline{\underline{r \left(1 + \cos \frac{\alpha}{2}\right)}}$$