

Aufgabe 3. Bereiche

a) $A = \pi r^2$ gefüllt = $\frac{3}{4} \pi r^2$ leer = $\frac{1}{4} \pi r^2$

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

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

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

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

b)

3

2

1

$y = \sin(x) + \frac{\pi}{2}$

$x=0:$

$\frac{\pi}{2} = 1.57$ P_1

$x=1.57:$

$1 + 1.57 = 2.57$ P_2

$x=3.14:$

$0 + 1.57 = 1.57$ P_3

$y=x$

$P_2(1.57/2.57)$

$P_3(3.14/1.57)$

P_2

P_3

Ca. 2.3

$$b) f(x) = \sin x + \frac{\sqrt{11}}{2}$$

$$x=2 \rightarrow 2 - 0.909297 = 1.090703 < \frac{\sqrt{11}}{2}$$

$$x=2.5 \rightarrow 2.5 - 0.59847 = 1.90153 > \frac{\sqrt{11}}{2}$$

Intervall $[2, 2.5]$

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

$$\text{Für } F(x) = 2.2 \rightarrow 0.80845 + \frac{\sqrt{11}}{2} = 2.3792927...$$

c) $h = 2r - y$ ↖ Einsetzen

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

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

$$y = r - r \cos \frac{x}{2} = r(1 - \cos \frac{x}{2})$$

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

$$2r - r + r \cos \frac{x}{2}$$

$$h = r + r \cos \frac{x}{2} = \underline{\underline{r(1 + \cos \frac{x}{2})}}$$