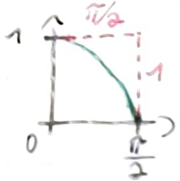
2.3

5)

a)

$$\frac{\pi}{4} \leq \int_0^{\pi/2} \cos x \, dx \leq \frac{\pi}{2}$$

Abschätzung nach oben:



$$\Rightarrow \int_0^{\pi/2} \cos x \, dx < \int_0^{\pi/2} \frac{\pi}{2} \cdot 1 \, dx = \int_0^{\pi/2} \frac{\pi}{2} \, dx \Rightarrow A_{\square} = \frac{\pi}{2} \cdot 1 = \frac{\pi}{2} \Rightarrow \int_0^{\pi/2} \cos x \, dx < \frac{\pi}{2}$$

Abschätzung nach unten:

$$\Rightarrow \int_0^{\pi/2} \cos x \, dx > \int_0^{\pi/2} \frac{2}{\pi} \cdot x \cdot 1 \, dx = \frac{2}{\pi} \int_0^{\pi/2} x \, dx + \int_0^{\pi/2} 1 \, dx = \frac{1}{\pi}\left(\left(\frac{\pi}{2}\right)^2 - 0^2\right) + 1 \cdot \left(\frac{\pi}{2} - 0\right)$$

$$= \frac{1}{4} + \frac{\pi}{2} = \frac{\pi}{4} \Rightarrow \int_0^{\pi/2} \cos x \, dx > \frac{\pi}{4}$$