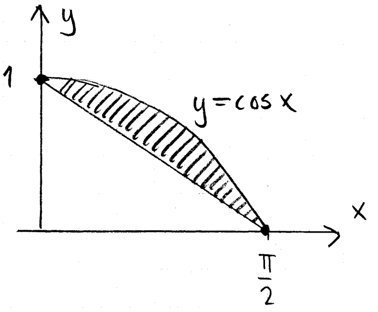
3438



Vi behöver först bestämma ekvationen för rät linje genom $(0,1)$ och $(\frac{\pi}{2}, 0)$

Lutningen

$$k = \frac{0-1}{\frac{\pi}{2}-0} = -\frac{2}{\pi}$$

Räta linjens ekvation på enpunktsform ger nu $\quad (y - y_1 = k(x - x_1))$

$$y - 1 = -\frac{2}{\pi}(x-0)$$

$$y = -\frac{2}{\pi}x + 1$$

Då har vi:

Övre funktion: $\quad y = \cos x$

Undre funktion: $\quad y = 1 - \frac{2}{\pi}x$

Sökta arean

$$A = \int_0^{\frac{\pi}{2}} \left(\cos x - \left(1 - \frac{2}{\pi}x\right)\right)dx = \int_0^{\frac{\pi}{2}} \left(\cos x - 1 + \frac{2}{\pi}x\right)dx$$

$$\frac{x^2}{\pi} = \frac{1}{\pi}\cdot x^2$$

$$= \left[\sin x - x + \frac{x^2}{\pi}\right]_0^{\frac{\pi}{2}} = \sin\frac{\pi}{2} - \frac{\pi}{2} + \frac{1}{\pi}\cdot\left(\frac{\pi}{2}\right)^2 - \left(\sin 0 - 0 + \frac{0^2}{2}\right)$$

$$= 1 - \frac{\pi}{2} + \frac{1}{\pi}\frac{\pi^2}{4} - 0 = 1 - \frac{\pi}{2} + \frac{\pi}{4}$$

$$= \frac{4 - 2\pi + \pi}{4} = \frac{4-\pi}{4} = 1 - \frac{\pi}{4} \text{ (a.e.)}$$ (Svar)