

Skjæringspunkter: $\sin x = \cos x \Leftrightarrow x = \frac{\pi}{4} + k\pi, k \in \mathbb{Z}$.

Fra figuren er "våre" skjæringspunkter $x = \frac{\pi}{4}$ og

$$x = \frac{\pi}{4} - \pi = -\frac{3\pi}{4}.$$

$$A = \int_{-\frac{3\pi}{4}}^{\frac{\pi}{4}} \cos x \, dx - \int_{-\frac{3\pi}{4}}^{\frac{\pi}{4}} \sin x \, dx$$

$$= \left[\sin x \right]_{x=-\frac{3\pi}{4}}^{\frac{\pi}{4}} + \left[\cos x \right]_{x=-\frac{3\pi}{4}}^{\frac{\pi}{4}}$$

$$= \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} = \frac{4\sqrt{2}}{2} = \underline{\underline{2\sqrt{2}}}$$

9.1:

$$5.) \int \frac{\ln(x^2)}{x^2} dx \stackrel{\downarrow}{=} -\frac{\ln(x^2)}{x} - \int \frac{2}{x} \left(-\frac{1}{x}\right) dx$$

$$\begin{aligned} &\left\{ \begin{array}{l} u = \ln(x^2) \\ u' = \frac{1}{x^2} = x^{-2} \\ u' \stackrel{\Downarrow}{=} \frac{1}{x^2} \cdot 2x = \frac{2}{x} \\ v = -x^{-1} = -\frac{1}{x} \end{array} \right. \begin{aligned} &= -\frac{\ln(x^2)}{x} + 2 \int x^{-2} dx \\ &= -\frac{\ln(x^2)}{x} + 2(-x^{-1}) + C \\ &= -\frac{\ln(x^2)}{x} - \frac{2}{x} + C \\ &\stackrel{\downarrow}{=} -\frac{2}{x} (\ln(x) + 1) + C \end{aligned} \end{aligned}$$

$$\boxed{\ln(x^2) = \ln(x) + \ln(x) = 2\ln(x)}$$