

PRINT Your Name: _____

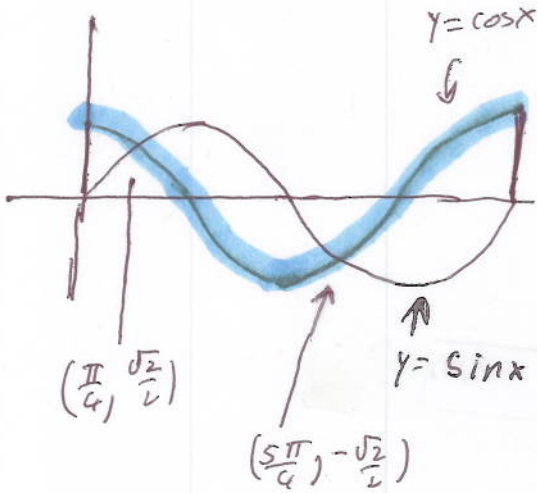
Quiz 3 — September 4, 2009 — 9:05 section

Remove everything from your desk except this page and a pencil or pen.

Circle your answer. Show your work.

The quiz is worth 5 points.

Find the area enclosed by $y = \sin x$, $y = \cos x$, $x = 0$, and $x = 2\pi$.



$$\begin{aligned} \text{Area} &= \int_0^{\frac{\pi}{4}} (\cos x - \sin x) dx + \int_{\frac{\pi}{4}}^{\frac{5\pi}{4}} (\sin x - \cos x) dx + \int_{\frac{5\pi}{4}}^{2\pi} (\cos x - \sin x) dx \\ &= \left[\sin x + \cos x \right]_0^{\frac{\pi}{4}} + \left[-\cos x - \sin x \right]_{\frac{\pi}{4}}^{\frac{5\pi}{4}} + \left[\sin x + \cos x \right]_{\frac{5\pi}{4}}^{2\pi} \\ &= \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} - 1 + \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} - \left(-\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2} \right) + 1 - \left(-\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2} \right) \\ &= 8 \frac{\sqrt{2}}{2} = \boxed{4\sqrt{2}} \end{aligned}$$