Ejercicio 5)

5) a) $\operatorname{sen}^2\left(x+\frac{\pi}{4}\right) - \cos^2\left(x+\frac{\pi}{4}\right) = \operatorname{sen} 2x$

$\left(\operatorname{sen} x \cdot \cos\frac{\pi}{4} + \operatorname{sen}\frac{\pi}{4} \cdot \cos x\right)^2 - \left(\cos x \cdot \cos\frac{\pi}{4} - \operatorname{sen}\frac{\pi}{4} \cdot \operatorname{sen} x\right)^2 = 2 \operatorname{sen} x \cdot \cos x$

$\left(\frac{\sqrt{2}}{2}\right)^2 (\operatorname{sen} x + \cos x)^2 - \left(\frac{\sqrt{2}}{2}\right)^2 (\cos x - \operatorname{sen} x)^2 = 2 \operatorname{sen} x \cdot \cos x$

(Binomio conjugado desarrollo binomio al cuadrado)

$\frac{2}{4} \cdot (\operatorname{sen} x + \cos x + \cos x - \operatorname{sen} x)(\operatorname{sen} x + \cos x - \cos x + \operatorname{sen} x) = 2 \operatorname{sen} x \cdot \cos x$

$\frac{1}{2} \cdot 2\cos x \cdot 2 \operatorname{sen} x = 2 \operatorname{sen} x \cdot \cos x$

$2 \cos x \cdot \operatorname{sen} x = 2 \operatorname{sen} x \cdot \cos x$

b) $(\operatorname{sen} 2x)^2 \cdot (2 \operatorname{sen}^2(2x) - 5) + 2 = 0$

$2 \operatorname{sen}^4(2x) - 5 \operatorname{sen}^2(2x) + 2 = 0$

$\operatorname{sen}^2 2x = z$ $\quad 2z^2 - 5z + 2 = 0 \quad z = \frac{5 \pm \sqrt{25-16}}{4} < \frac{1}{2}$

$\operatorname{sen}^2(2x) = 2$

$\operatorname{sen}(2x) = \pm\sqrt{2}$ No hay sol

$\operatorname{sen}^2(2x) = \frac{1}{2}$

$\operatorname{sen}(2x) = \pm\sqrt{\frac{1}{2}}$

$+\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$2x = \frac{\pi}{4} + 2k\pi$

$x = \frac{\pi}{8} + k\pi$

$2x = \frac{3\pi}{4} + 2k\pi$

$x = \frac{3\pi}{8} + k\pi$

$-\frac{1}{\sqrt{2}} = \frac{-\sqrt{2}}{2}$

$2x = \frac{5\pi}{4} + 2k\pi$

$x = \frac{5\pi}{8} + k\pi$

$2x = \frac{7\pi}{4} + 2k\pi$

$x = \frac{7\pi}{8} + k\pi$