Modulo Ejercicio 7

P2 c) $\cos(-2x) = \cos(x)$

Idea llevar Todos los Terminos A $\cos(x)$, para dejar un polinomio

$$\cos(-2x) = \cos(x) \iff \cos(2x) = \cos(x) \quad / \text{Paridad}$$

$$\iff \cos(x)^2 - \sin(x)^2 = \cos(x)$$

$$\iff \cos(x)^2 - (1 - \cos^2(x)) = \cos(x)$$

$$\iff 2\cos(x)^2 - 1 = \cos(x)$$

$$\iff 2\cos(x)^2 - \cos(x) - 1 = 0$$

$$\iff 2u^2 - u - 1 = 0 \quad / \cos(x) = u$$

$$\iff u = \frac{1 \pm \sqrt{1+8}}{4} = 1 \text{ o } -\frac{1}{2}$$

Opción 1 $\cos(x) = 1 \implies \boxed{x = 2k\pi, \ k \in \mathbb{Z}}$

Opción 2 $\cos(x) = -\frac{1}{2} \implies \boxed{x = 2k\pi \pm \frac{2\pi}{3}, \ k \in \mathbb{Z}}$

Solución : $\{2k\pi, k \in \mathbb{Z}\} \cup \{2k\pi \pm \frac{2\pi}{3}, k \in \mathbb{Z}\}$

d) $\sin(2x) + \sqrt{3}\cos(2x) = 1 \quad / \cdot \frac{1}{2}$

$\iff \sin(2x)\cdot\frac{1}{2} + \frac{\sqrt{3}}{2}\cdot\cos(2x) = \frac{1}{2}$

$\iff \sin(2x)\cdot\cos\left(\frac{\pi}{3}\right) + \sin\left(\frac{\pi}{3}\right)\cdot\cos(2x) = \frac{1}{2}$

$\iff \sin\left(2x + \frac{\pi}{3}\right) = \frac{1}{2}$

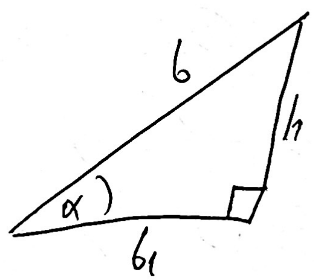
En general $\alpha\cdot\sin(x) + \beta\cos(x) = \gamma$ Suele resolverse Así

$\iff 2x + \frac{\pi}{3} = \frac{\pi}{6}(-1)^k + k\pi \ , \ k \in \mathbb{Z}$

$\iff \boxed{x = \frac{k\pi}{2} + \frac{\pi}{12}(-1)^k - \frac{\pi}{6}}$

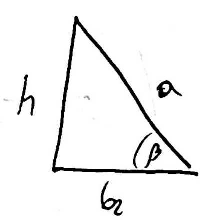
Extra P3

Triangulo 1



$b_1 = 6\cdot\cos(\alpha)$
$h = 6\cdot\sin(\alpha)$

Triangulo 2



$b_2 = a\cdot\cos(\beta)$
$h = a\cdot\sin(\beta)$

$\text{Area} = \text{Area } T_1 + \text{Area } T_2 \Rightarrow 4\,\text{Area} = 4\,\text{Area } T_1 + 4\cdot\text{Area } T_2$

$2\,\text{Area } T_1 = b_1\cdot h = 6^2\sin(\alpha)\cdot\cos(\alpha)$
$2\,\text{Area } T_2 = b_2\cdot h = a^2\sin(\beta)\cdot\cos(\beta)$

$4\,\text{Area} = 6^2\cdot 2\sin(\alpha)\cdot\cos(\alpha) + a^2\cdot 2\sin(\beta)\cdot\cos(\beta)$

$\boxed{4\,\text{Area} = a^2\cdot\sin(2\beta) + 6^2\cdot\sin(2\alpha)}$