Soluciones de ecuaciones trigonométricas I

Ejercicio 2 resuelto

$$sen\left(x+\frac{\pi}{4}\right)=\frac{\sqrt{3}}{2}$$

$$\frac{\sqrt{3}}{2}\to\begin{cases} sen\,60^{o} \\ sen\,120^{o} \end{cases}$$

$x+45^{o}=60^{o}$ $\qquad$ $x_1=15^{o}+360^{o}k$

$x+45^{o}=120^{o}$ $\qquad$ $x_2=75^{o}+360^{o}k$

Ejercicio 3 resuelto

$$2tg\,x-3\cot g\;x-1=0$$

$2tg\,x-\dfrac{3}{tg\,x}-1=0$ $\qquad$ $2tg^{2}\,x-tg\,x-3=0$

$$tg\,x=\frac{1\pm\sqrt{1+24}}{4}=\frac{1\pm5}{4}$$

$tg\,x=\dfrac{3}{2}$ $\qquad$ $x=56^{\circ}18'35''+180^{\circ}k$

$tg\,x=-1$ $\qquad$ $x=135^{\circ}+180^{\circ}k$

Ejercicio 4 resuelto

$$3sen^2 x - 5sen\,x + 2 = 0$$

$$sen\,x = \frac{5 \pm \sqrt{25-24}}{6} = \frac{5 \pm 1}{6}$$

$$sen\ x = 1 \qquad x = 90° + 360°k$$

$$sen\ x = \frac{2}{3} \qquad x = \begin{cases} 41°48'37'' + 360°k \\ 138°11'23'' + 360°k \end{cases}$$

Ejercicio 5 resuelto

$$\cos^2 x - 3sen^2 x = 0$$

$$1 - sen^2 x - 3sen^2 x = 0 \qquad 1 - 4sen^2 x = 0$$

$$sen^2 x = \frac{1}{4} \qquad sen\,x = \pm\frac{1}{2}$$

$$x = arcsen\frac{1}{2} \Rightarrow \begin{cases} x_1 = 30° + 360°k \\ x_2 = 150° + 360°k \end{cases}$$

$$x = arcsen\left(-\frac{1}{2}\right) \Rightarrow \begin{cases} x_3 = 210° + 360°k \\ x_4 = 330° + 360°k \end{cases}$$

Ejercicio 6 resuelto

$$\cos 2x = 1 + 4sen\,x$$

$$\cos^2 x - sen^2 x = 1 + 4sen\,x$$

$$1 - sen^2 x - sen^2 x = 1 + 4sen\,x$$

$$2sen^2 x + 4sen\,x = 0$$

$$2sen\,x\,(sen\,x+2)=0 \Rightarrow \begin{cases} sen\,x=0 \\ sen\,x+2=0 \end{cases}$$

$$x=arcsen\,0 \Rightarrow \begin{cases} x_1=0°+360°k \\ \\ x_2=180°+360°k \end{cases} \qquad x=0°+180°k$$

$$x=arcsen(-2) \qquad \text{Sin solución}$$

Ejercicio 7 resuelto

$$sen(2x+60°)+sen(x+30°)=0$$

$$2\,sen\left(\frac{3x}{2}+45°\right)cos\left(\frac{x}{2}+15°\right)=0$$

$$sen\left(\frac{3x}{2}+45°\right)=0 \Rightarrow \begin{cases} \frac{3x}{2}+45°=0°+360°k & x=-30°+120°K \\ \frac{3x}{2}+45°=180°+360°k & x=-30°+120°K \end{cases}$$

$$cos\left(\frac{x}{2}+15°\right)=0 \Rightarrow \begin{cases} \frac{x}{2}+15°=90°+360°k & x=150°+360° \\ \frac{x}{2}+15°=270°+360°k & x=510°+360°K \\ & x=150°+360°K \end{cases}$$

Ejercicio 8 resuelto

$$sen^2x-cos^2x=\frac{1}{2}$$

$$sen^2x-cos^2x=\frac{1}{2} \qquad cos^2x-sen^2x=-\frac{1}{2} \qquad cos\,2x=-\frac{1}{2}$$

$$2x=\begin{cases}120^\circ+360^\circ k\\240^\circ+360^\circ k\end{cases}\Rightarrow x=\begin{cases}60^\circ+180^\circ k\\120^\circ+180^\circ k\end{cases}$$

Ejercicio 9 resuelto

$$\cos 8x+\cos 6x=2\cos 210^\circ\cdot\cos x$$

$$2\cos 7x\cdot\cos x=2\cos 210^\circ\cdot\cos x$$

$$\cos x\left(\cos 7x-\cos 210^\circ\right)=0$$

$$\cos x=0 \qquad x=\begin{cases}x=90^\circ+360^\circ k\\x=270^\circ+360^\circ k\end{cases} \qquad x=90^\circ+180^\circ k$$

$$\cos 7x-\cos 210^\circ=0 \qquad 7x=210^\circ \quad x=30^\circ$$