17/11/2022

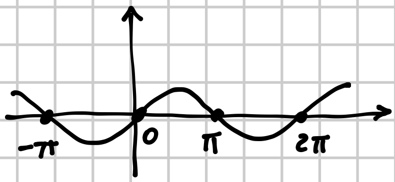
**179** $2\sin^2 x - 5\sin x + 1 = 2\left(\cos^2 x - \frac{1}{2}\right)$ $[k\pi]$

$$2\sin^2 x - 5\sin x + 1 = 2\left(1 - \sin^2 x - \frac{1}{2}\right)$$

$$2\sin^2 x - 5\sin x \cancel{+1} = \cancel{2} - 2\sin^2 x \cancel{-1}$$

$$4\sin^2 x - 5\sin x = 0$$

$$\sin x\,(4\sin x - 5) = 0$$




$$\sin x = 0 \quad \vee \quad 4\sin x - 5 = 0$$

$$x = k\pi \quad \vee \quad \sin x = \frac{5}{4} > 1 \text{ IMPOSS.}$$

$$\boxed{x = k\pi}$$

**221** $\sqrt{2}\sin 2x + 2\cos x - \sqrt{2}\sin x - 1 = 0$ $\left[\pm\frac{\pi}{3} + 2k\pi;\ \frac{5}{4}\pi + 2k\pi;\ \frac{7}{4}\pi + 2k\pi\right]$

$$2\sqrt{2}\sin x\cos x + 2\cos x - \sqrt{2}\sin x - 1 = 0$$

$$2\cos x\left(\sqrt{2}\sin x + 1\right) - \left(\sqrt{2}\sin x + 1\right) = 0$$

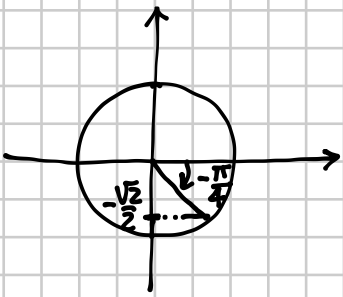
$$\left(\sqrt{2}\sin x + 1\right)\left(2\cos x - 1\right) = 0$$

$$\sqrt{2}\sin x + 1 = 0 \quad \vee \quad 2\cos x - 1 = 0$$

$$①\ \sin x = -\frac{1}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}} \quad \vee \quad ②\ \cos x = \frac{1}{2}$$

① $\sin x = -\frac{\sqrt{2}}{2} \implies x = -\frac{\pi}{4} + 2k\pi \quad \vee \quad x = \pi - \left(-\frac{\pi}{4}\right) + 2k\pi$

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




② $\cos x = \frac{1}{2} \implies x = \pm\frac{\pi}{3} + 2k\pi$

$$\boxed{x = -\frac{\pi}{4} + 2k\pi \quad \vee \quad x = \frac{5}{4}\pi + 2k\pi \quad \vee \quad x = \pm\frac{\pi}{3} + 2k\pi}$$

è lo stesso insieme
individuato da $x = \frac{7}{4}\pi + 2k\pi$, infatti con $k=1$ si ha $-\frac{\pi}{4} + 2\pi = \frac{7}{4}\pi$ ...
e con $k=-1$ si ha $\frac{7}{4}\pi - 2\pi = -\frac{\pi}{4}$ ...

$$\left\{x \in \mathbb{R} \mid x = -\frac{\pi}{4} + 2k\pi,\ \text{con } k \in \mathbb{Z}\right\} = \left\{x \in \mathbb{R} \mid x = \frac{7}{4}\pi + 2k\pi,\ k \in \mathbb{Z}\right\}$$

**225** $\cos 4x - \cos 2x = \sin 3x$ $\left[k\frac{\pi}{3}; \frac{7}{6}\pi + k\pi; \frac{11}{6}\pi + 2k\pi\right]$

$$\cos p + \cos q = 2\cos\frac{p+q}{2}\cos\frac{p-q}{2}$$

$$\cos p - \cos q = -2\sin\frac{p+q}{2}\sin\frac{p-q}{2}$$

FORMULE DI PROSTAFERESI (applichiamo la seconda)

$$-2\sin\frac{4x+2x}{2}\sin\frac{4x-2x}{2} = \sin 3x$$

$$-2\sin 3x \cdot \sin x = \sin 3x$$

$$2\sin 3x \cdot \sin x + \sin 3x = 0$$

$$\sin 3x\,(2\sin x + 1) = 0$$

$$\sin 3x = 0 \quad \vee \quad 2\sin x + 1 = 0$$

$$3x = k\pi \quad \vee \quad \sin x = -\frac{1}{2}$$

$$\Downarrow$$

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

$$x = -\frac{\pi}{6} + 2k\pi \quad \vee \quad x = \pi - \left(-\frac{\pi}{6}\right) + 2k\pi$$

$$x = -\frac{\pi}{6} + 2k\pi \quad \vee \quad x = \frac{7}{6}\pi + 2k\pi$$

$$\boxed{x = k\frac{\pi}{3} \quad \vee \quad x = -\frac{\pi}{6} + 2k\pi \quad \vee \quad x = \frac{7}{6}\pi + 2k\pi}$$