264 $\sqrt{3}\sin\left(x+\frac{4}{3}\pi\right)+\sin\left(x-\frac{7}{6}\pi\right)+2=0$ $\left[\frac{\pi}{3}+2k\pi\right]$

$$\sqrt{3}\left[\sin x\cos\frac{4}{3}\pi+\cos x\sin\frac{4}{3}\pi\right]+\sin x\cos\frac{7}{6}\pi-\cos x\sin\frac{7}{6}\pi$$
$$+2=0$$

$$\frac{4}{3}\pi=\pi+\frac{\pi}{3} \qquad \frac{7}{6}\pi=\pi+\frac{\pi}{6}$$

$$\sqrt{3}\left[\sin x\left(-\cos\frac{\pi}{3}\right)+\cos x\left(-\sin\frac{\pi}{3}\right)\right]+\sin x\left(-\cos\frac{\pi}{6}\right)-\cos x\left(-\sin\frac{\pi}{6}\right)$$
$$+2=0$$

$$\sqrt{3}\left[-\frac{1}{2}\sin x-\frac{\sqrt{3}}{2}\cos x\right]-\frac{\sqrt{3}}{2}\sin x+\frac{1}{2}\cos x+2=0$$

$$-\frac{\sqrt{3}}{2}\sin x-\frac{3}{2}\cos x-\frac{\sqrt{3}}{2}\sin x+\frac{1}{2}\cos x+2=0$$

$$-\sqrt{3}\sin x-\cos x=-2$$

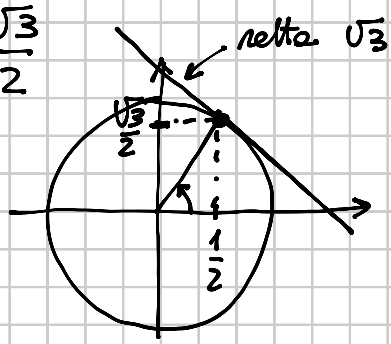
$$\sqrt{3}\sin x+\cos x=2 \qquad X=\cos x \quad Y=\sin x$$

$$\begin{cases}X^2+Y^2=1\\ \sqrt{3}Y+X=2\end{cases} \qquad \begin{cases}(2-\sqrt{3}Y)^2+Y^2=1\\ X=2-\sqrt{3}Y\end{cases} \qquad \begin{cases}4+3Y^2-4\sqrt{3}Y+Y^2=1\\ //\end{cases}$$

$$4Y^2-4\sqrt{3}Y+3=0 \qquad \frac{\Delta}{4}=12-12=0$$

$$(2Y-\sqrt{3})^2=0 \Rightarrow Y=\frac{\sqrt{3}}{2}$$

$$\begin{cases}X=2-\frac{3}{2}=\frac{1}{2}\\ Y=\frac{\sqrt{3}}{2}\end{cases} \qquad \begin{cases}\cos x=\frac{1}{2}\\ \sin x=\frac{\sqrt{3}}{2}\end{cases}$$



retta $\sqrt{3}Y+X=2$
(tangente)

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

ALTRO METODO DI RISOLUZIONE DELLE EQUAZIONI LINEARI

$\Downarrow$

SOSTITUZIONI PARAMETRICHE

247 $\cos x - \sqrt{3}\,\sin x = 1$ $\qquad \left[2k\pi; -\frac{2}{3}\pi + 2k\pi\right]$

$\cos x = \dfrac{1-t^2}{1+t^2} \qquad t = \tan\dfrac{x}{2}$

$\sin x = \dfrac{2t}{1+t^2} \qquad x \neq \pi + 2k\pi$

1° PASSO = Controllare se $\pi + 2k\pi$ è soluzione dell'equazione

$\cos\pi - \sqrt{3}\cdot\sin\pi \stackrel{?}{=} 1$

$-1 - \sqrt{3}\cdot 0 = 1$

$-1 = 1$ FALSO

$\pi + 2k\pi$ <u>NON</u> è soluzione

2° PASSO

$$\frac{1-t^2}{1+t^2} - \sqrt{3}\,\frac{2t}{1+t^2} = 1$$

$$\frac{1-t^2-2\sqrt{3}t}{\cancel{1+t^2}} = \frac{1+t^2}{\cancel{1+t^2}}$$

$$-2t^2 - 2\sqrt{3}\,t = 0$$

$$t^2 + \sqrt{3}\,t = 0 \qquad t(t+\sqrt{3}) = 0 \quad \begin{cases} t = 0 \\ t = -\sqrt{3} \end{cases}$$

$$t = \tan\frac{x}{2}$$

$$\tan\frac{x}{2} = 0 \quad \vee \quad \tan\frac{x}{2} = -\sqrt{3}$$

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

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

256 $\sqrt{3}\sin x + \cos x + 1 = 0$

1° PASSO = CONTROLLO $x = \pi + 2k\pi$

$$\sqrt{3}\sin\pi + \cos\pi + 1 \overset{?}{=} 0$$

$$0 + (-1) + 1 = 0 \quad \underline{\underline{\text{OK}}} \qquad \underbrace{x = \pi + 2k\pi}_{\text{È SOLUZIONE}}$$

2° PASSO = SOSTITUZIONE PARAMETRICA

$$\sqrt{3}\,\frac{2t}{1+t^2} + \frac{1-t^2}{1+t^2} + 1 = 0$$

$$\frac{2\sqrt{3}t + 1 - \cancel{t^2} + 1 + \cancel{t^2}}{\cancel{1+t^2}} = 0$$

$$2\sqrt{3}t + 2 = 0$$

$$2\sqrt{3}t = -2$$

$$t = -\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$$

$$\tan\frac{x}{2} = -\frac{\sqrt{3}}{3} \qquad \frac{x}{2} = -\frac{\pi}{6} + k\pi$$

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

soluzione finale $\Rightarrow$ $\boxed{x = \pi + 2k\pi \quad \vee \quad x = -\frac{\pi}{3} + 2k\pi}$

Si potrebbe anche usare il metodo dell'angolo aggiunto per trasformare un'equazione del tipo $a\cos x + b\sin x = c$ in una del tipo $r\sin(x+\varphi) = c$
$(r > 0)$

251 $\sqrt{3}\sin x + \cos x = \sqrt{3}$

(FATTA IERI COL METODO GRAFICO)

CONTROLLO $\sqrt{3}\sin\pi + \cos\pi \overset{?}{=} \sqrt{3}$

$0 \quad -1 = \sqrt{3}$ FALSO! $\quad x = \pi + 2k\pi$

NON È SOLUZIONE

$$\sqrt{3}\,\frac{2t}{1+t^2} + \frac{1-t^2}{1+t^2} = \sqrt{3}$$

$$\frac{2\sqrt{3}t + 1 - t^2}{\cancel{1+t^2}} = \frac{\sqrt{3}(1+t^2)}{\cancel{1+t^2}}$$

$$2\sqrt{3}t + 1 - t^2 = \sqrt{3} + \sqrt{3}t^2$$

$$(\sqrt{3}+1)t^2 - 2\sqrt{3}t + \sqrt{3} - 1 = 0 \qquad \frac{\Delta}{4} = 3 - (\sqrt{3}+1)(\sqrt{3}-1) =$$

$$= 3 - (3-1) = 1$$

$$t = \frac{\sqrt{3} \pm 1}{\sqrt{3}+1} = \begin{cases} 1 \\ \frac{\sqrt{3}-1}{\sqrt{3}+1} \cdot \frac{\sqrt{3}-1}{\sqrt{3}-1} = \frac{3+1-2\sqrt{3}}{3-1} = \frac{4-2\sqrt{3}}{2} = 2-\sqrt{3} \end{cases}$$

$$\tan\frac{x}{2} = 1 \quad \vee \quad \tan\frac{x}{2} = 2-\sqrt{3}$$

HO BISOGNO DEL FORMULARIO!

$$\frac{x}{2} = \frac{\pi}{4} + k\pi \quad \vee \quad \frac{x}{2} = \frac{\pi}{12} + k\pi$$

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