Risolvi le seguenti equazioni in $\mathbb{R}$

1) $2\sin x + 2 = 3\sin x + 4$ [impossibile]

2) $2\sin\left(x - \frac{\pi}{3}\right) - 1 = 0$ $\left[x = \frac{\pi}{2} + 2k\pi \vee x = \frac{7}{6}\pi + 2k\pi\right]$

3) $2\sin\frac{x}{2} = 1$ $\left[x = \frac{5}{3}\pi + 4k\pi \vee x = \frac{\pi}{3} + 4k\pi\right]$

4) $2\cos\left(x - \frac{\pi}{18}\right) - \sqrt{3} = 0$ $\left[x = -\frac{\pi}{9} + 2k\pi \vee x = \frac{2}{9}\pi + 2k\pi\right]$

5) $2\cos x + \sqrt{3} = 0$ $\left[x = \pm\frac{5}{6}\pi + 2k\pi\right]$

6) $2\cos x + 2 = \cos x + 2$ $\left[x = \frac{\pi}{2} + \cancel{k}\pi\right]$

7) $\cdot\ \mathrm{tg}\, 3x = 3$ $\left[x = \frac{1}{3}\operatorname{arctg} 3 + k\frac{\pi}{3}\right]$

8) $\mathrm{tg}\left(x + \frac{\pi}{6}\right) + 1 = 0$ $\left[x = -\frac{5}{12}\pi + k\pi\right]$

9) $\sin 4x = \sin\left(2x - \frac{\pi}{3}\right)$ $\left[x = -\frac{\pi}{6} + k\pi \vee x = \frac{2}{9}\pi + k\frac{\pi}{3}\right]$

10) $\sin 2x = -\sin x$ $\left[x = \frac{2}{3}k\pi \vee x = \pi + 2k\pi\right]$

11) $\mathrm{tg}\, 5x = \mathrm{tg}\, 3x$ $\left[x = k\frac{\pi}{2}\right]$

RICONDUCIBILI A ELEMENTARI

12) $\cos^2 x + \sin^2 2x = 1$ (Formule di duplicazione) $\Rightarrow$ BIQUADRATICA $\left[x = \pm\frac{\pi}{3}\right.$

13) $2\cos^2 x - \cos x = 0$ $\left[x = \frac{\pi}{2} + k\pi \vee x = \pm\frac{\pi}{3} + 2k\pi\right]$

14) $2\cos^2 x - 3\cos x + 1 = 2\sin^2 x$ $\left[x = 2k\pi \vee x = \pm\arccos\left(-\frac{1}{4}\right) + 2k\pi\right]$

15) $(\mathrm{tg}\, x - \sqrt{3})(\cos x + 1) = 0$ $\left[x = \frac{\pi}{3} + k\pi \vee x = \pi + 2k\pi\right]$

EQUAZIONI LINEARI IN SENO E COSENO

$x \neq \pi + 2k\pi$ $\quad \sin x = \frac{2t}{1+t^2}$ $\quad \cos x = \frac{1-t^2}{1+t^2}$ $\quad t = \operatorname{tg}\frac{x}{2}$

1) $\cos x - \sin x = 0$ $\quad \left[x = -\frac{\pi}{2} + 2k\pi \ \vee \ x = 2k\pi\right]$

2) $\sqrt{3}\cos x + \sin x = \sqrt{3}$ $\quad \left[x = 2k\pi \ \vee \ x = \frac{\pi}{3} + 2k\pi\right]$

3) $\sin\left(\frac{\pi}{2} + x\right) + \sin x = 1$ $\quad \left[x = \frac{\pi}{2} + 2k\pi \ \vee \ x = 2k\pi\right]$
[SUGGERIMENTO: $\sin\left(\frac{\pi}{2} + x\right) = \cos x$ ARCHI ASSOCIATI
oppure FORMULE DI ADDIZIONI PER IL SENO]

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

5) $\sqrt{3}\sin x + \cos x + 1 = 0$ $\quad \left[x = \pi + 2k\pi \ \vee \ x = \frac{5}{3} + 2k\pi\right]$

EQUAZIONI OMOGENEE DI 2° GRADO IN SENO E COSENO

1) $2\sqrt{3}\cos^2 x - 2\sin x\cos x = \sqrt{3}$ $\quad \left[x = \frac{2}{3}\pi + k\pi \ \vee \ x = \frac{\pi}{6} + k\pi\right]$
(Ricorda: moltiplico il termine noto per $1 = \sin^2 x + \cos^2 x$, divido tutto per $\cos^2 x \neq 0$ $x \neq \frac{\pi}{2} + k\pi$, ottengo una equazione in $\operatorname{tg} x$)

2) $\sin^2 x - \sqrt{3}\sin x\cos x = 0$ $\quad \left[x = k\pi \ \vee \ x = \frac{\pi}{3} + k\pi\right]$

3) $\sqrt{3}\cos^2 x - \sin x\cos x = \sqrt{3}$ $\quad \left[x = k\pi \ \vee \ x = -\frac{\pi}{6} + k\pi\right]$

4) $3\sin^2 x + \cos^2 x + 2\sin x\cos x = 2$ $\quad \left[x = \frac{\pi}{8} + k\frac{\pi}{2}\right]$

5) $\sin x\cos x - \cos^2 x = 0$ $\quad \left[x = \frac{\pi}{2} + k\pi \ \vee \ x = \frac{\pi}{4} + k\pi\right]$

6) $4\sin^2 x - \sin x\cos x + 3 = 0$ $\quad$ [impossibile]