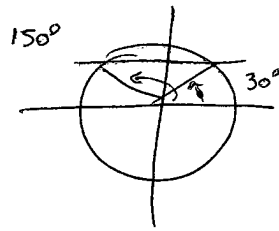


$$① \quad 2 \operatorname{sen}(x+20^\circ) = \sqrt{3}$$

$$\operatorname{sen}(x+20^\circ) = \frac{\sqrt{3}}{2}$$

$$x+20^\circ = 30^\circ + 360^\circ k$$

$$\boxed{x = 10^\circ + 360^\circ k}$$

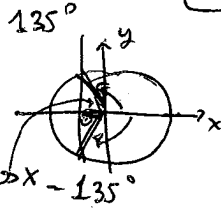


$$\checkmark \quad x+20 = 150^\circ + 360^\circ k$$

$$\boxed{x = 130^\circ + 360^\circ k}$$

$$② \quad \cos(3x-45^\circ) = -\frac{\sqrt{2}}{2}$$

$$3x-45^\circ = \pm 135^\circ + 360^\circ k$$



$$3x-45 = 135 + 360k$$

$$3x = 180 + 360k$$

$$\boxed{x = 60^\circ + 120^\circ k}$$

$$3x-45 = -135 + 360k$$

$$3x = -90 + 360k$$

$$\boxed{x = -30^\circ + 120^\circ k}$$

$$③ \quad \operatorname{sen}^2 x = \frac{1}{2} \operatorname{sen}(180^\circ - x)$$

$$\operatorname{sen}^2 x = \frac{1}{2} \operatorname{sen} x$$

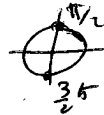
$$2 \operatorname{sen}^2 x = \operatorname{sen} x$$

$$2 \operatorname{sen}^2 x - \operatorname{sen} x = 0$$

$$\operatorname{sen} x (2 \operatorname{sen} x - 1) = 0$$

$$\operatorname{sen} x = 0$$

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

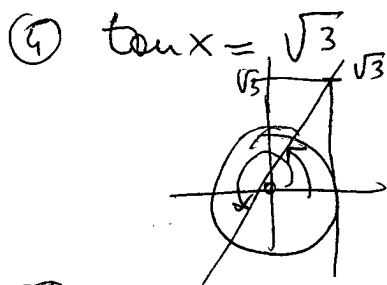
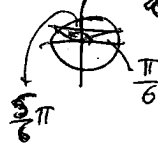


$$2 \operatorname{sen} x - 1 = 0$$

$$\operatorname{sen} x = \frac{1}{2}$$

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

$$\checkmark \quad x = \frac{5\pi}{6} + 2k\pi$$



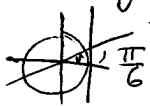
$$\boxed{x = \frac{\pi}{3} + k\pi}$$

$$⑤ \quad 3 \operatorname{tg}^2 \frac{x}{2} + 2\sqrt{3} \operatorname{tg} \frac{x}{2} - 3 = 0$$

$$\operatorname{tg} \frac{x}{2} = \frac{-2\sqrt{3} \pm \sqrt{(2\sqrt{3})^2 - 4 \cdot 3 \cdot (-3)}}{6} = \frac{-2\sqrt{3} \pm \sqrt{12+36}}{6} = \frac{-2\sqrt{3} \pm 4\sqrt{3}}{6}$$

$$\operatorname{tg} \frac{x}{2} = \frac{-2\sqrt{3} + 4\sqrt{3}}{6} = \frac{2\sqrt{3}}{6} = \frac{\sqrt{3}}{3}$$

$$\operatorname{tg} \frac{x}{2} = \frac{-2\sqrt{3} - 4\sqrt{3}}{6} = \frac{-6\sqrt{3}}{6} = -\sqrt{3}$$



$$\therefore \frac{x}{2} = \left(\frac{\pi}{6} + k\pi\right) \cdot 2 \rightarrow \boxed{x = \frac{\pi}{3} + 2k\pi}$$

$$\therefore \frac{x}{2} = \left(\frac{\pi}{3} + k\pi\right) \cdot 2 \rightarrow \boxed{x = \frac{2\pi}{3} + 2k\pi}$$

6

$$\cos 2x = \sin x$$

$$\cos^2 x - \sin^2 x = \sin x$$

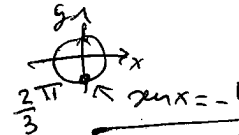
$$1 - \sin^2 x - \sin^2 x = \sin x$$

$$-2\sin^2 x - \sin x + 1 = 0$$

$$2\sin^2 x + \sin x - 1 = 0$$

$$\sin x_{1,2} = \frac{-1 \pm \sqrt{1+8}}{4} = \frac{-1 \pm 3}{4}$$

(Formule di duplicazione)



$$X = \frac{3\pi}{2} + 2k\pi$$

$$X = \frac{\pi}{6} + 2k\pi$$

$$X = \frac{5\pi}{6} + 2k\pi$$

7

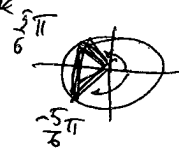
$$\cos\left(\frac{\pi}{3} - x\right) + \cos\left(\frac{\pi}{3} + x\right) = -\frac{\sqrt{3}}{2}$$

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

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

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

$$X = \pm \frac{5\pi}{6} + 2k\pi$$



8

$$\cos^2 \frac{x}{2} = \sin^2 x - \cos x$$

duplicazioni

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

$$1 + \cos x = 2 - 2\cos^2 x - 2\cos x$$

$$2\cos^2 x + 3\cos x - 1 = 0$$

if above

$$\frac{-3 - \sqrt{17}}{4} < -1$$

Non è accettabile

$$\cos x = \frac{-3 \pm \sqrt{9+8}}{4} = \frac{-3 \pm \sqrt{17}}{4}$$

$$x = \pm \arccos\left(\frac{-3 \pm \sqrt{17}}{4}\right) + 2k\pi$$

9

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

LINEARE
IN SENO - COSENO

divido per cos x

$$\tan x + \sqrt{3} = 0$$

$$\tan x = -\sqrt{3}$$

$$X = -\frac{\pi}{3} + k\pi$$

Provare π e soluzioni:

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

$$0 + \sqrt{3}(-1) = 0$$

(Non è mai
il capovolgimento
No) come d'

è l'unica soluzione

tenere conto