

$$1) \sqrt{3}\operatorname{ctg}^2 2x + \operatorname{ctg} 2x = 0 \rightarrow \operatorname{ctg} 2x(\sqrt{3}\operatorname{ctg} 2x + 1) = 0 \rightarrow x = \frac{\pi}{4} + k\frac{\pi}{2} \vee x = \frac{\pi}{3} + k\frac{\pi}{2}$$

$$2) \operatorname{sen}^3 x - \operatorname{sen} x \cos^2 x = 0 \rightarrow x = k\pi \vee x = \frac{\pi}{4} + k\frac{\pi}{2}$$

$$3) \cos 3x - \cos 5x = \operatorname{sen} 6x + \operatorname{sen} 2x \rightarrow \text{prostaferesi } \operatorname{sen} 4x(\cos 2x - \operatorname{sen} x) = 0 \rightarrow$$

$$x = \frac{\pi}{6} + 2k\pi \vee x = \frac{5}{6}\pi + 2k\pi \vee x = \frac{k\pi}{4}$$

$$4) \cos^2\left(\frac{11}{6}\pi - x\right) + \frac{\sqrt{3}}{4}\operatorname{sen} 2x = \cos^2 x \rightarrow \operatorname{sen}^2 x - \cos^2 x = 0 \rightarrow x = \frac{\pi}{4} + k\frac{\pi}{2}$$

$$5) \operatorname{tg}\left(\frac{\pi}{3} + x\right) = \operatorname{tg}\left(\frac{\pi}{3} - x\right) + 4 \rightarrow x = \frac{3}{4}\pi + k\pi \vee x = \operatorname{arctg}\frac{1}{3} + k\pi$$

$$6) \operatorname{sen}\left(3x - \frac{\pi}{3}\right) = -\operatorname{sen}\left(\frac{\pi}{4} + x\right) \rightarrow x = \frac{1}{48}\pi + k\frac{\pi}{2} \vee x = \frac{19}{24} + k\pi$$

$$7) \operatorname{sen} x + \cos x = \frac{1}{2}(\sqrt{3} + 1) \rightarrow x = \frac{1}{6}\pi + 2k\pi \vee x = \frac{1}{3}\pi + 2k\pi$$

$$8) \operatorname{sen}^2 x + 7\cos^2 x + 2\sqrt{3}\operatorname{sen} x \cdot \cos x = 4 \rightarrow x = \frac{5}{6}\pi + k\pi \vee x = \frac{1}{3}\pi + k\pi$$

$$9) 2\sqrt{2}\operatorname{sen} x \cdot \cos x = 1 \rightarrow x = \frac{\pi}{8} + k\pi \vee x = \frac{3}{8}\pi + k\pi$$

$$10) \operatorname{tg}\left(\frac{\pi}{4} - \frac{x}{2}\right) + \operatorname{sen} x = 1 \rightarrow x = 2k\pi \vee x = \frac{\pi}{2} + 2k\pi$$

$$11) \operatorname{sen} 2x - \cos x < 0 \rightarrow 0 \leq x < \frac{\pi}{6} \vee \frac{\pi}{2} < x < \frac{5}{6}\pi \vee \frac{3}{2}\pi < x \leq 2\pi$$

$$12) 2\cos^2 x - 3\cos x + 1 \leq 0 \rightarrow 0 \leq x \leq \frac{\pi}{3} \vee \frac{\pi}{3} \leq x \leq 2\pi$$