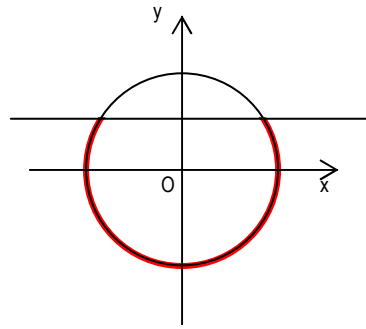


1. $2 \operatorname{sen} x - 1 < 0$

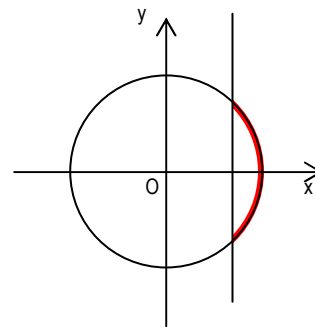
$$\operatorname{sen} x < \frac{1}{2}$$

$$-\frac{7}{6} \pi + 2k\pi < x < \frac{\pi}{6} + 2k\pi$$



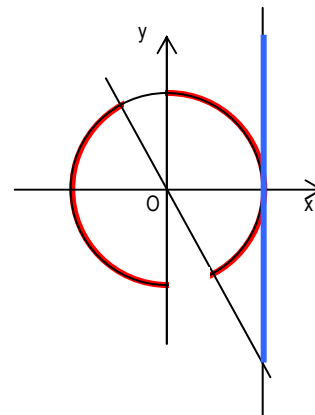
2. $\cos x > \frac{\sqrt{2}}{2}$

$$-\frac{\pi}{4} + 2k\pi < x < \frac{\pi}{4} + 2k\pi$$



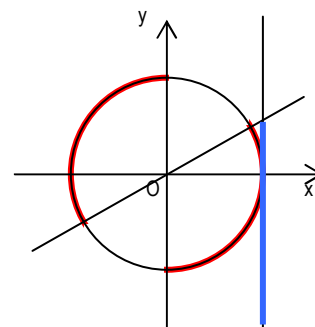
3. $\operatorname{tg} x > -\sqrt{3}$

$$\frac{2}{3} \pi + k\pi < x < \frac{3}{2} \pi + k\pi$$



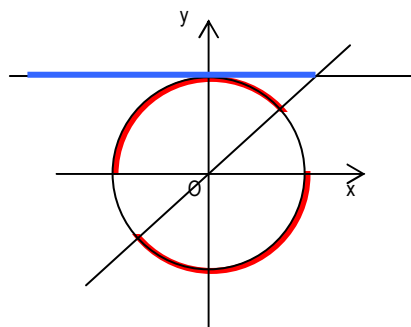
4. $\operatorname{tg} x < \frac{\sqrt{3}}{3}$

$$\frac{\pi}{2} + k\pi < x < \frac{7}{6} \pi + k\pi$$



5. $\text{ctg } x < 1$

$$\frac{\pi}{4} + k\pi < x < \pi + k\pi$$

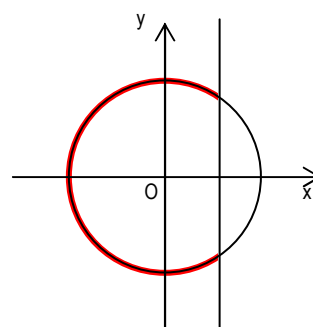


6. $2 \cos \left(x - \frac{\pi}{3} \right) - 1 < 0$

$$\cos \left(x - \frac{\pi}{3} \right) < \frac{1}{2}$$

$$\frac{\pi}{3} + 2k\pi < x - \frac{\pi}{3} < \frac{5}{3}\pi + 2k\pi$$

$$\frac{2}{3}\pi + 2k\pi < x < 2\pi + 2k\pi$$

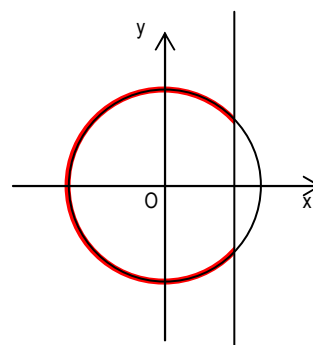


7. $2 \cos \left(2x - \frac{\pi}{4} \right) - \sqrt{2} < 0$

$$\cos \left(2x - \frac{\pi}{4} \right) < \frac{\sqrt{2}}{2}$$

$$\frac{\pi}{4} + 2k\pi < 2x - \frac{\pi}{4} < \frac{7}{4}\pi + 2k\pi$$

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



$$\frac{\pi}{4} + k\pi < x < \pi + k\pi$$

8. $\text{ctg} \left(x + \frac{\pi}{3} \right) > 0$

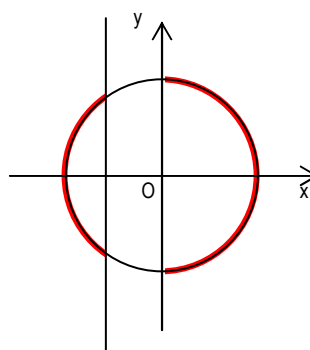
$$k\pi < x + \frac{\pi}{3} < \frac{\pi}{2} + k\pi$$

$$-\frac{\pi}{3} + k\pi < x < \frac{\pi}{6} + k\pi$$

9. $2 \cos^2 x + \cos x > 0$

$$\cos x (2 \cos x + 1) > 0 \quad \left| \begin{array}{l} \cos x = 0 \\ \cos x = -\frac{1}{2} \end{array} \right.$$

$$\cos x < -\frac{1}{2} \vee \cos x > 0$$



$$-\frac{\pi}{2} + 2k\pi < x < \frac{\pi}{2} + 2k\pi \vee \frac{2}{3}\pi + 2k\pi < x < \frac{4}{3}\pi + 2k\pi$$

10. $\cos^2 x + 2 \cos x < 0$

$$\cos x (\cos x + 2) < 0$$

posso semplificare il fattore $\cos x + 2$ che è positivo per qualsiasi valore di x

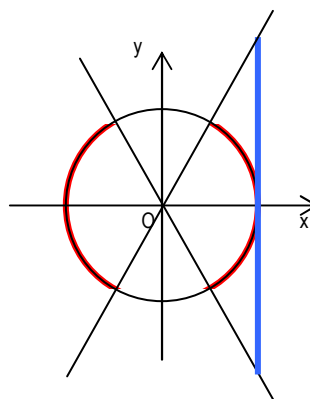
$$\cos x < 0$$

$$\frac{\pi}{2} + 2k\pi < x < \frac{3}{2}\pi + 2k\pi$$

11. $\text{tg}^2 x - 3 < 0$

$$\text{tg} x = \pm \sqrt{3} \Rightarrow -\sqrt{3} < \text{tg} x < \sqrt{3}$$

$$-\frac{\pi}{3} + k\pi < x < \frac{\pi}{3} + k\pi$$

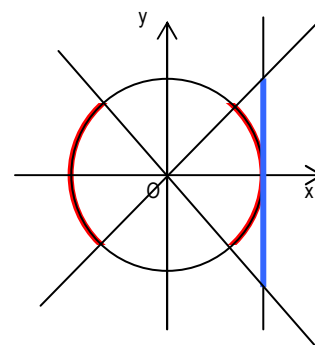


12. $\text{tg}^2 x - \text{ctg}^2 x < 0$

$$\text{tg}^2 x - \frac{1}{\text{tg}^2 x} < 0 \Rightarrow \frac{\text{tg}^4 x - 1}{\text{tg}^2 x} < 0 \Rightarrow \frac{(\text{tg}^2 x - 1)(\text{tg}^2 x + 1)}{\text{tg}^2 x} < 0$$

$$\text{tg} x \neq 0 \quad -1 < \text{tg} x < 1$$

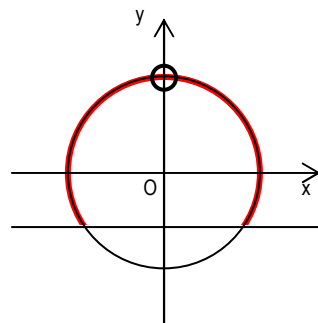
$$-\frac{\pi}{4} + k\pi < x < \frac{\pi}{4} + k\pi \wedge x \neq k\pi$$



13. $2 \operatorname{sen}^2 x - \operatorname{sen} x - 1 < 0$

$$\operatorname{sen} x = \frac{1 \pm \sqrt{1+8}}{4} = \begin{cases} 1 \\ -\frac{1}{2} \end{cases} \quad -\frac{1}{2} < \operatorname{sen} x < 1$$

$$-\frac{\pi}{6} + 2k\pi < x < \frac{7}{6}\pi + 2k\pi \quad \wedge \quad x \neq \frac{\pi}{2} + 2k\pi$$

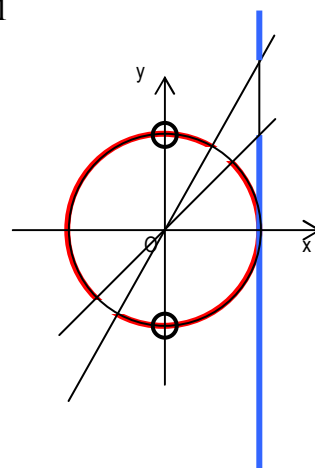


14. $\operatorname{tg}^2 x - (1 + \sqrt{3}) \operatorname{tg} x + \sqrt{3} > 0$

$$\operatorname{tg} x = \frac{1 + \sqrt{3} \pm \sqrt{1 + 2\sqrt{3} + 3 - 4\sqrt{3}}}{2} = \frac{1 + \sqrt{3} \pm (\sqrt{3} - 1)}{2} = \begin{cases} \sqrt{3} \\ 1 \end{cases}$$

$$\operatorname{tg} x < 1 \quad \vee \quad \operatorname{tg} x > \sqrt{3}$$

$$-\frac{\pi}{2} + k\pi < x < \frac{\pi}{4} + k\pi \quad \vee \quad \frac{\pi}{3} + k\pi < x < \frac{\pi}{2} + k\pi$$



15. $2 \cos^2 x + \cos x - 1 > 0$

$$\cos x = \frac{-1 \pm \sqrt{1+8}}{4} = \begin{cases} \frac{1}{2} \\ -1 \end{cases} \quad \cos x < -1 \quad \vee \quad \cos x > \frac{1}{2}$$

$$\Rightarrow \cos x > \frac{1}{2}$$

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

