

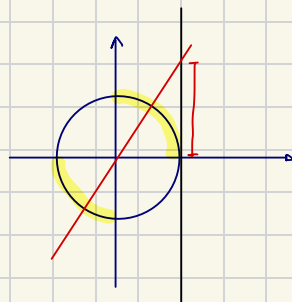
$$\operatorname{tg}(2x) \leq 0$$

Uso le formule di duplicazione $\operatorname{tg}(2x) = \frac{2\operatorname{tg}(x)}{1-\operatorname{tg}^2(x)} \leq 0$

Si fa come una frazione classica: $N > 0, D > 0$ e poi grafico dei segni.

$N \geq 0$ $2\operatorname{tg}(x) \geq 0 \quad \operatorname{tg}(x) \geq 0$

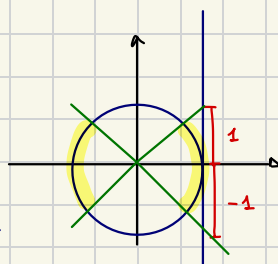
$\Rightarrow 0 \leq x < \frac{\pi}{2} \vee \pi \leq x < \frac{3}{2}\pi$



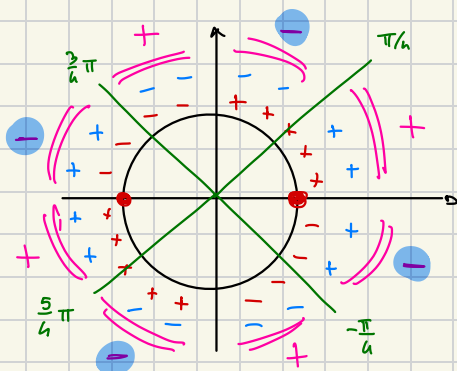
$D > 0$ $1 - \operatorname{tg}^2(x) > 0 \quad \operatorname{tg}^2(x) < 1$

facciamo le radici $\Rightarrow |\operatorname{tg}(x)| < 1$

$\Rightarrow -\frac{\pi}{4} < x < \frac{\pi}{4} \vee \frac{3}{4}\pi < x < \frac{5}{4}\pi$



Faccio il grafico dei segni: Nelle dis. goniometriche riportiamo tutto su una circonferenza invece che su una retta.



Sol finale:

$\frac{\pi}{4} < x < \frac{\pi}{2} \vee$

$\frac{3}{4}\pi < x \leq \pi \vee$

$\frac{5}{4}\pi < x < \frac{3}{2}\pi \vee$

$\frac{7}{4}\pi < x \leq 2\pi$

Oss: Si può scrivere più compatta con i periodi:

Pag 883 n561

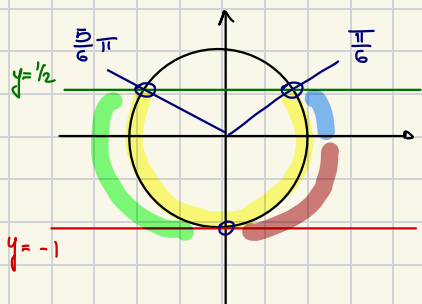
$$2\sin^2 x + \sin x - 1 < 0$$

$$\sin x = G$$

$$2G^2 + G - 1 < 0$$

$$\Delta = 1 + 8 \quad G_{1,2} = \frac{-1 \pm 3}{4} < \begin{matrix} -1 \\ \frac{1}{2} \end{matrix} \quad -1 < G < \frac{1}{2}$$

$$-1 < \sin x < \frac{1}{2}$$



Sol finale: $0 < x < \frac{\pi}{6}$ ✓

$\frac{5}{6}\pi < x < \frac{3}{2}\pi$ ✓

$\frac{3}{2}\pi < x \leq 2\pi$

Pag 885 n582

$$\sin x > \sin(2x)$$

$$\sin x > 2\sin x \cos x \quad \rightsquigarrow \quad 2\sin x \cos x - \sin x < 0$$

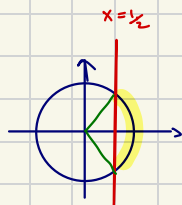
$$\sin x (2\cos x - 1) < 0$$

$$f_1 > 0 \quad \sin x > 0$$

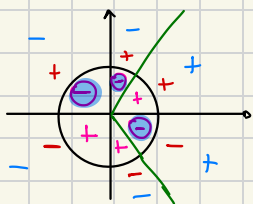
$$0 < x < \pi$$

$$f_2 > 0 \quad 2\cos x - 1 > 0$$

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



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



Sol: $\frac{\pi}{3} < x < \pi$ ✓ $\frac{5}{3}\pi < x < 2\pi$