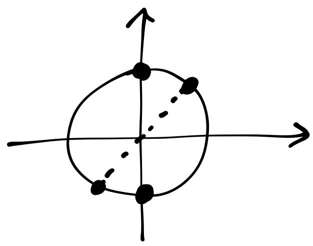
14/11/2018

233 $\tan\left(x+\frac{\pi}{4}\right)-(1+\tan x)=0$

C.E. $\begin{cases} x \neq \frac{\pi}{2}+k\pi \\ x+\frac{\pi}{4} \neq \frac{\pi}{2}+k\pi \end{cases}$

$\begin{cases} x \neq \frac{\pi}{2}+k\pi \\ x \neq \frac{\pi}{2}-\frac{\pi}{4}+k\pi \end{cases}$

$\boxed{\text{C.E. } \begin{cases} x \neq \frac{\pi}{2}+k\pi \\ x \neq \frac{\pi}{4}+k\pi \end{cases}}$



$$\frac{\tan x+\tan\frac{\pi}{4}}{1-\tan x\cdot\tan\frac{\pi}{4}}-(1+\tan x)=0$$

$$\frac{\tan x+1}{1-\tan x}-(1+\tan x)=0$$

$$\frac{\tan x \cancel{+1} \cancel{-1}+\tan^2 x}{\cancel{1-\tan x}}=0$$

$$\tan^2 x+\tan x=0$$

$$\tan x(\tan x+1)=0$$

$\tan x=0 \Rightarrow x=k\pi$

$\vee$

$\tan x=-1 \Rightarrow x=-\frac{\pi}{4}+k\pi$

$k\in\mathbb{Z}$

399 $4\sin^2 x + \cos 2x - \sqrt{3}\,\sin 2x = 0$

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

$\sin^2 x = \dfrac{1-\cos 2x}{2}$

$4\sin^2 x + \cos 2x - 2\sqrt{3}\sin x\cos x = 0$

$4\sin^2 x + \cos^2 x - \sin^2 x - 2\sqrt{3}\sin x\cos x = 0$

$\dfrac{3\sin^2 x}{\cos^2 x} - \dfrac{2\sqrt{3}\sin x\cos x}{\cos^2 x} + \dfrac{\cos^2 x}{\cos^2 x} = 0$

$3\tan^2 x - 2\sqrt{3}\tan x + 1 = 0$

$(\sqrt{3}\tan x - 1)^2 = 0 \qquad \tan x = \dfrac{1}{\sqrt{3}}$

$\boxed{x = \dfrac{\pi}{6} + k\pi}$

279 $\cos^2\dfrac{\alpha}{2} - \sin^2\dfrac{\alpha}{2} + 2 =$ Scrivere in funzione di $t = \tan\dfrac{\alpha}{2}$

$= \cos\left(2\cdot\dfrac{\alpha}{2}\right) + 2 = \cos\alpha + 2 = \dfrac{1-t^2}{1+t^2} + 2 =$

$= \dfrac{1-t^2+2+2t^2}{1+t^2} = \dfrac{t^2+3}{t^2+1}$

277 $\dfrac{\sin^2\dfrac{\alpha}{2}+1}{4-\cos^2\dfrac{\alpha}{2}}-\dfrac{1}{2}=$ $\left[\dfrac{-1}{8t^2+6}\right]$

$$=\frac{\dfrac{1-\cos\alpha}{2}+1}{4-\dfrac{1+\cos\alpha}{2}}-\frac{1}{2}=\frac{\dfrac{1-\cos\alpha+2}{\cancel{2}}}{\dfrac{8-1-\cos\alpha}{\cancel{2}}}-\frac{1}{2}=$$

$$=\frac{3-\cos\alpha}{7-\cos\alpha}-\frac{1}{2}=\frac{3-\dfrac{1-t^2}{1+t^2}}{7-\dfrac{1-t^2}{1+t^2}}-\frac{1}{2}=$$

$$=\frac{\dfrac{3+3t^2-1+t^2}{\cancel{1+t^2}}}{\dfrac{7+7t^2-1+t^2}{\cancel{1+t^2}}}-\frac{1}{2}=\frac{2+4t^2}{\underset{2(3+4t^2)}{6+8t^2}}-\frac{1}{2}=$$

$$=\frac{2+\cancel{4t^2}-3-\cancel{4t^2}}{2(3+4t^2)}=-\frac{1}{2(3+4t^2)}$$

428 $\frac{1+\cos 2x}{\cos x} - \frac{\sin 2x}{2-2\cos^2 x} = 0$ $\left[\frac{\pi}{6}+2k\pi; \frac{5}{6}\pi+2k\pi\right]$

$2(1-\cos^2 x)$

C.E.

$\cos x \neq 0 \Rightarrow \begin{cases} x \neq \frac{\pi}{2}+k\pi \\ x \neq k\pi \end{cases}$

$\cos x \neq \pm 1 \Rightarrow$

$\Downarrow$

$x \neq k\frac{\pi}{2}$

$$\frac{\cancel{1}+2\cos^2 x-\cancel{1}}{\cos x} - \frac{\cancel{2}\,\cancel{\sin x}\cos x}{\cancel{2}\cdot \sin^{\cancel{2}} x} = 0$$

$$\frac{2\cos^{\cancel{2}} x}{\cancel{\cos x}} - \frac{\cos x}{\sin x} = 0$$

$$2\cos x - \frac{\cos x}{\sin x} = 0 \qquad \cancel{\cos x}\left(2-\frac{1}{\sin x}\right)=0$$

$$2-\frac{1}{\sin x}=0 \Rightarrow \sin x = \frac{1}{2}$$

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

486

$$\begin{cases} x + y = \pi \longrightarrow x = \pi - y \\ \sin(\pi - x) + \sqrt{3}\cos y = 1 \end{cases}$$

$$\sin(\cancel{\pi} - \cancel{\pi} + y) + \sqrt{3}\cos y = 1$$

$$\sin y + \sqrt{3}\cos y = 1$$

$$\begin{cases} X^2 + Y^2 = 1 \\ Y + \sqrt{3}X = 1 \end{cases} \qquad \begin{cases} X^2 + (1 - \sqrt{3}X)^2 - 1 = 0 \\ Y = 1 - \sqrt{3}X \end{cases}$$

$$X^2 + \cancel{1} + 3X^2 - 2\sqrt{3}X - \cancel{1} = 0$$

$$4X^2 - 2\sqrt{3}X = 0 \qquad 2X(2X - \sqrt{3}) = 0$$

$$\begin{cases} X = 0 \\ Y = 1 \end{cases} \vee \begin{cases} X = \frac{\sqrt{3}}{2} \\ Y = -\frac{1}{2} \end{cases}$$

$\Downarrow$

SONO LO STESSO K

$$\begin{cases} y = \frac{\pi}{2} + 2k\pi \\ x = \pi - \left(\frac{\pi}{2} + 2k\pi\right) \end{cases}$$

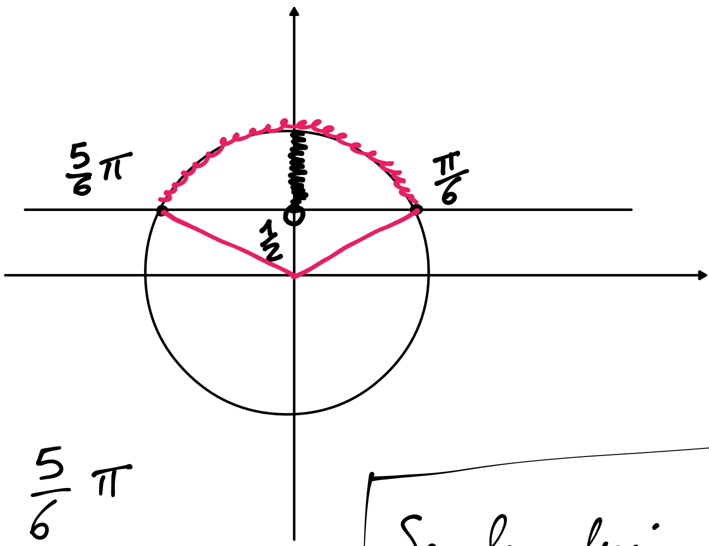
$x = \pi - y$

$$\begin{cases} y = -\frac{\pi}{6} + 2k\pi \\ x = \pi - \left(-\frac{\pi}{6} + 2k\pi\right) \end{cases}$$

$$\boxed{\begin{cases} x = \frac{\pi}{2} - 2k\pi \\ y = \frac{\pi}{2} + 2k\pi \end{cases} \vee \begin{cases} x = \frac{7}{6}\pi - 2k\pi \\ y = -\frac{\pi}{6} + 2k\pi \end{cases}}$$

498 $2\sin x > 1$ $\left[\frac{\pi}{6} < x < \frac{5}{6}\pi\right]$ nell'intervallo $[0, 2\pi]$

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



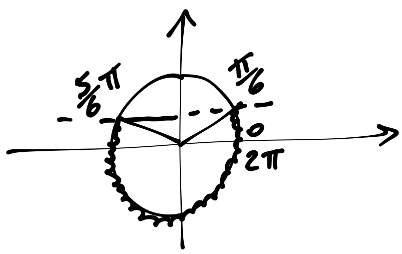
$$\frac{\pi}{6} < x < \frac{5}{6}\pi$$

Se le soluzioni in $\mathbb{R}$

$$\frac{\pi}{6} + 2K\pi < x < \frac{5}{6}\pi + 2K\pi$$

STESSO K

Se fosse stato $\sin x < \frac{1}{2}$ in $[0, 2\pi]$

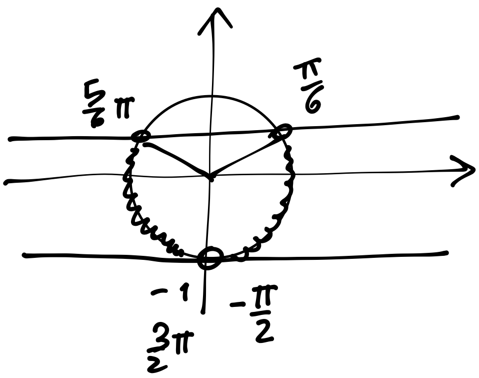


$$0 < x < \frac{\pi}{6} \quad \vee \quad \frac{5}{6}\pi < x < 2\pi$$

561 $2\sin^2 x + \sin x - 1 < 0$ in $\mathbb{R}$

$$\sin x = \frac{-1 \pm \sqrt{1+8}}{4} = \frac{-1 \pm 3}{4} = \begin{cases} -1 \\ \frac{1}{2} \end{cases}$$

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



$$-\frac{\pi}{2} < x < \frac{\pi}{6} \quad \vee \quad \frac{5}{6}\pi < x < \frac{3}{2}\pi \quad \leftarrow \text{INCOMPLETO}$$

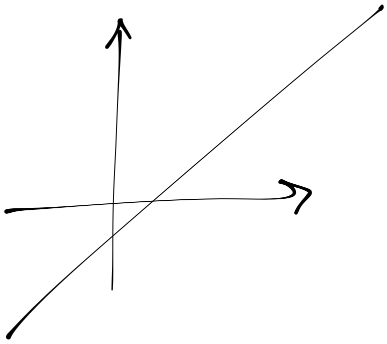
$$\boxed{-\frac{\pi}{2} + 2k\pi < x < \frac{\pi}{6} + 2k\pi \quad \vee \quad \frac{5}{6}\pi + 2k\pi < x < \frac{3}{2}\pi + 2k\pi}$$

579 $\sqrt{3}\sin x - \cos x - 1 \geq 0$

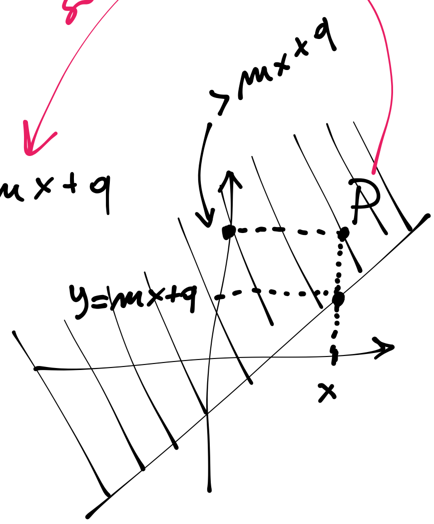
$$\begin{cases} X^2 + Y^2 = 1 \\ \sqrt{3}\,Y - X - 1 \geq 0 \end{cases}$$ SEMIPIANO

SODDISFA LA DISUG.

$y = mx + q$

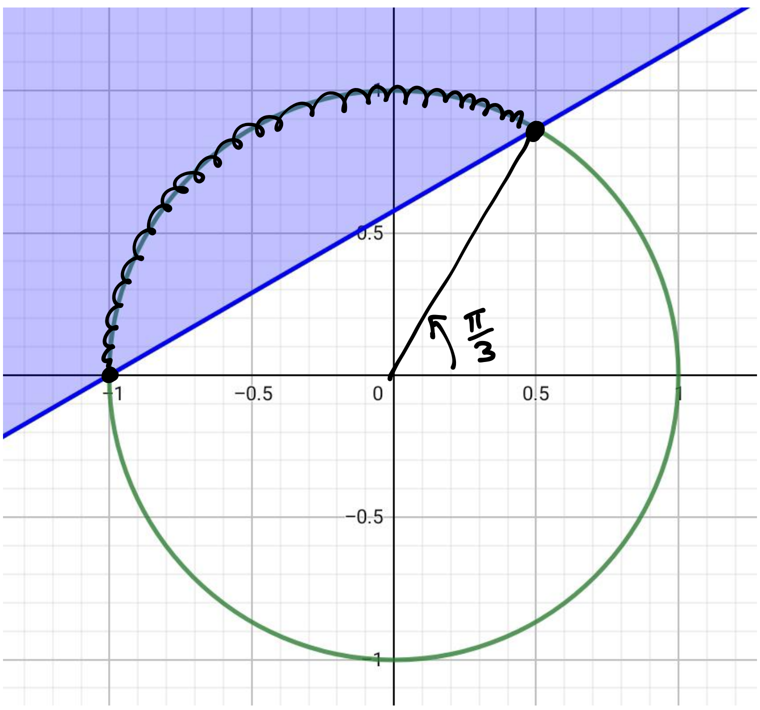


$y \geq mx + q$



$$\begin{cases} X^2 + Y^2 = 1 & \text{CIRC. GON.} \\ Y \geq \frac{\sqrt{3}}{3}X + \frac{\sqrt{3}}{3} & \text{SEMIPIANO SUPERIORE} \end{cases}$$

DI ORIGINE (BORDO) $Y = \frac{\sqrt{3}}{3}X + \frac{\sqrt{3}}{3}$



$$\begin{cases} X^2 + Y^2 = 1 \\ Y = \frac{\sqrt{3}}{3}X + \frac{\sqrt{3}}{3} \end{cases} \dots$$

$$\dots \Rightarrow \begin{cases} X = \frac{1}{2} \\ Y = \frac{\sqrt{3}}{2} \end{cases} \vee \begin{cases} X = -1 \\ Y = 0 \end{cases}$$

$$x = \frac{\pi}{3} \qquad\qquad x = \pi$$

$$\boxed{\frac{\pi}{3} + 2k\pi \leq x \leq \pi + 2k\pi}$$