31/10/2018

76 $\cos\left(x-\frac{2}{3}\pi\right)=2\cos\left(x-\frac{2}{3}\pi\right)+\tan\frac{\pi}{4}$

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

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

$\cos t=-1 \iff t=\pi+2k\pi$

[OSSERVAZIONE
$\pm\pi+2k\pi$ è la stessa cosa che scrivere $\pi+2k\pi$]

$\downarrow$

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

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

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

106 $\left|\tan\left(x-\frac{\pi}{3}\right)\right| = \sqrt{3}$ $\left[k\pi;\frac{2}{3}\pi+k\pi\right]$

$$\tan\left(x-\frac{\pi}{3}\right) = \pm\sqrt{3}$$

$$\tan\left(x-\frac{\pi}{3}\right) = -\sqrt{3} \quad \vee \quad \tan\left(x-\frac{\pi}{3}\right) = \sqrt{3}$$

$$x-\frac{\pi}{3} = -\frac{\pi}{3}+k\pi \quad \vee \quad x-\frac{\pi}{3} = \frac{\pi}{3}+k\pi$$

$$x = k\pi \quad \vee \quad x = \frac{2}{3}\pi + k\pi$$

120 $\sin\left(2x+\frac{\pi}{5}\right) = \sin\left(5x+\frac{\pi}{2}\right)$

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

$$\vee$$

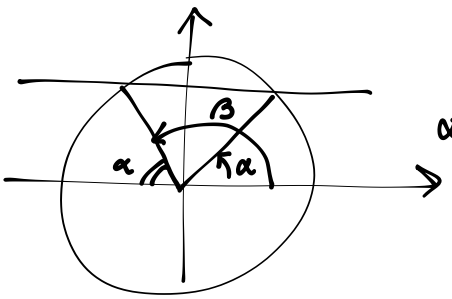
$$2x+\frac{\pi}{5} = \pi-\left(5x+\frac{\pi}{2}\right)+2k\pi$$

$\sin\alpha = \sin\beta$

$\alpha = \beta + 2k\pi$

$\vee$

$\alpha = (\pi-\beta)+2k\pi$



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

$$-3x = \frac{3}{10}\pi+2k\pi \quad \vee \quad 7x = \frac{3}{10}\pi+2k\pi$$

$$x = -\frac{\pi}{10}+\frac{2}{3}k\pi \quad \vee \quad x = \frac{3}{70}\pi+\frac{2}{7}k\pi$$

123 $\sin\left(2x-\frac{\pi}{8}\right)=-\sin\left(\frac{3}{4}\pi-3x\right)$

$-\sin\alpha=\sin(-\alpha)$

$$\sin\left(2x-\frac{\pi}{8}\right)=\sin\left(-\frac{3}{4}\pi+3x\right)$$

$$2x-\frac{\pi}{8}=-\frac{3}{4}\pi+3x+2k\pi \quad \vee \quad 2x-\frac{\pi}{8}=\pi+\frac{3}{4}\pi-3x+2k\pi$$

$$-x=\frac{\pi}{8}-\frac{3}{4}\pi+2k\pi \quad \vee \quad 5x=\frac{\pi}{8}+\pi+\frac{3}{4}\pi+2k\pi$$

$$x=\frac{5}{8}\pi+2k\pi \quad \vee \quad 5x=\frac{\pi+8\pi+6\pi}{8}+2k\pi$$

$$5x=\frac{15}{8}\pi+2k\pi$$

$$x=\frac{5}{8}\pi+2k\pi \quad \vee \quad x=\frac{3}{8}\pi+\frac{2}{5}k\pi$$

137 $\cos x = \sin\left(4x - \frac{\pi}{4}\right)$

$\sin\alpha = \cos\left(\frac{\pi}{2} - \alpha\right)$

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

$\cos x = \cos\left(-4x + \frac{3}{4}\pi\right)$

$\cos\alpha = \cos\beta$

$\alpha = \pm\beta + 2k\pi$

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

$x = 4x - \frac{3}{4}\pi + 2k\pi$ V $x = -4x + \frac{3}{4}\pi + 2k\pi$

$-3x = -\frac{3}{4}\pi + 2k\pi$ $5x = \frac{3}{4}\pi + 2k\pi$

$x = \frac{\pi}{4} + k\frac{2\pi}{3}$ V $x = \frac{3}{20}\pi + k\frac{2\pi}{5}$

142 $\cos\left(3x - \frac{\pi}{9}\right) = -\cos\left(4x - \frac{2}{3}\pi\right)$

$-\cos\alpha = \cos(\pi - \alpha)$

$\cos\left(3x - \frac{\pi}{9}\right) = \cos\left(\pi - 4x + \frac{2}{3}\pi\right)$

$3x - \frac{\pi}{9} = -\left(\pi - 4x + \frac{2}{3}\pi\right) + 2k\pi$ V $3x - \frac{\pi}{9} = \pi - 4x + \frac{2}{3}\pi + 2k\pi$

$-x = \frac{\pi}{9} - \pi - \frac{2}{3}\pi + 2k\pi$ $7x = \frac{\pi}{9} + \pi + \frac{2}{3}\pi + 2k\pi$

$x = \frac{14}{9}\pi + 2k\pi$ V $x = \frac{16}{63}\pi + k\frac{2\pi}{7}$

162 $\tan 2x - \cot\frac{3}{2}x = 0$ $\left[\frac{\pi}{7} + \frac{2}{7}k\pi\right]$

$\tan 2x = \cot\frac{3}{2}x$

$\tan 2x = \tan\left(\frac{\pi}{2} - \frac{3}{2}x\right)$

$2x = \frac{\pi}{2} - \frac{3}{2}x + K\pi$

$2x + \frac{3}{2}x = \frac{\pi}{2} + K\pi$

$\frac{7}{2}x = \frac{\pi}{2} + K\pi$

$x = \frac{\pi}{7} + K\frac{2\pi}{7}$

$\tan\alpha = \tan\beta$

$\alpha = \beta + K\pi$

$\cot\left(\frac{\pi}{2} - \alpha\right) = \tan\alpha$

$\tan\left(\frac{\pi}{2} - \alpha\right) = \cot\alpha$

C.E. $2x \neq \frac{\pi}{2} + K\pi$

$\frac{3}{2}x \neq K\pi$

....

172 $3 + 4\cos^2 x - 4\sqrt{3}\cos x = 0$ $\left[\pm\frac{\pi}{6} + 2k\pi\right]$

$(2\cos x - \sqrt{3})^2 = 0$

$\Downarrow$

$2\cos x - \sqrt{3} = 0$ $\quad\cos x = \frac{\sqrt{3}}{2}$

$x = \pm\frac{\pi}{6} + 2K\pi$

183 $2\sin^2 x + \sin x - 1 = 0$

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

$\sin x = -1 \quad \vee \quad \sin x = \frac{1}{2}$

$x = \frac{3}{2}\pi + 2k\pi \quad \vee \quad x = \frac{\pi}{6} + 2k\pi \quad \vee \quad x = \frac{5}{6}\pi + 2k\pi$

185 $2\cos^2 x - 3\cos x + 1 = 2\sin^2 x$

$2\cos^2 x - 3\cos x + 1 = 2(1 - \cos^2 x)$

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

$4\cos^2 x - 3\cos x - 1 = 0$

$$\cos x = \frac{3 \pm \sqrt{9+16}}{8} = \frac{3 \pm 5}{8} = \begin{cases} 1 \\ -\frac{1}{4} \end{cases}$$

$\cos x = 1 \quad \vee \quad \cos x = -\frac{1}{4}$

$x = 2k\pi \quad \vee \quad x = \pm \arccos\left(-\frac{1}{4}\right) + 2k\pi$

193 $(\tan x + \cot x) \cdot (2\cos x) = 4$ ²

C.E. $x \neq K\frac{\pi}{2}$

$$\left(\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x}\right) \cdot \cos x = 2$$

$$\frac{\sin^2 x + \cos^2 x}{\cos x \cdot \sin x} \cdot \cos x = 2$$

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

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

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$$\frac{\cos x + 2}{\sqrt{\cos x}} - \sqrt{\cos x} = \sqrt{4\cos x + 6}$$

C.E.

$\cos x > 0$

$$\frac{\cos x + 2 - \cos x}{\sqrt{\cos x}} = \frac{\sqrt{4\cos^2 x + 6\cos x}}{\sqrt{\cos x}}$$

$$\sqrt{4\cos^2 x + 6\cos x} = 2$$

$$4\cos^2 x + 6\cos x = 4$$

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

$$\cos x = \frac{-3 \pm \sqrt{9+16}}{4} = \frac{-3 \pm 5}{4} = \begin{cases} \frac{1}{2} \\ -2 \text{ N.A.} \end{cases}$$

$\cos x = \frac{1}{2}$ $\qquad$ $x = \pm \frac{\pi}{3} + 2K\pi$