10/11/2022

33 $2\cos\left(x-\frac{\pi}{4}\right)+\sin\left(x-\frac{\pi}{6}\right)+4\cos\left(\frac{7}{4}\pi+x\right)+\cos\left(\frac{\pi}{3}+x\right)-3\sqrt{2}\sin x =$ $[3\sqrt{2}\cos x]$

$= 2\left[\cos x\cos\frac{\pi}{4}+\sin x\sin\frac{\pi}{4}\right]+\sin x\cos\frac{\pi}{6}-\cos x\sin\frac{\pi}{6}+$

$+4\left[\cos\left(\frac{7}{4}\pi\right)\cdot\cos x-\sin\frac{7}{4}\pi\cdot\sin x\right]+\cos\frac{\pi}{3}\cos x-\sin\frac{\pi}{3}\sin x-3\sqrt{2}\sin x=$

$=\sqrt{2}\cos x+\sqrt{2}\sin x+\cancel{\frac{\sqrt{3}}{2}\sin x}-\frac{1}{2}\cos x+4\left[\cos\left(2\pi-\frac{\pi}{4}\right)\cdot\cos x-\right.$

$\left.-\sin\left(2\pi-\frac{\pi}{4}\right)\cdot\sin x\right]+\cancel{\frac{1}{2}\cos x}-\cancel{\frac{\sqrt{3}}{2}\sin x}-3\sqrt{2}\sin x=$

$=\sqrt{2}\cos x+\cancel{\sqrt{2}\sin x}+2\sqrt{2}\cos x+\cancel{2\sqrt{2}\sin x}-\cancel{3\sqrt{2}\sin x}=$

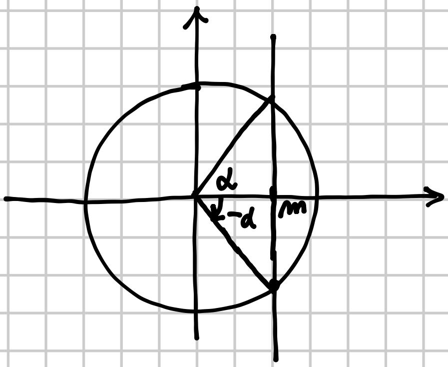
$=\boxed{3\sqrt{2}\cos x}$

SEGUE DALLA LEZIONE PRECEDENTE

2) $\cos x = m \qquad m \in \mathbb{R}$

a) $|m| > 1$ IMPOSSIBILE

b) $|m| \leq 1 \qquad x = \arccos(m) = \alpha$ una soluzione



$$x = \alpha + 2k\pi \quad \vee \quad x = -\alpha + 2k\pi$$

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

ESEMPI

- $\cos x = \frac{\sqrt{3}}{2}$ trovo un angolo α il cui coseno è $\frac{\sqrt{3}}{2}$ (ad es. $\alpha = \arccos\frac{\sqrt{3}}{2} = \frac{\pi}{6}$)

$$x = \pm\frac{\pi}{6} + 2k\pi \qquad k = 0, \pm 1, \pm 2, \pm 3, \dots \in \mathbb{Z}$$

è un insieme (infinito) di soluzioni =

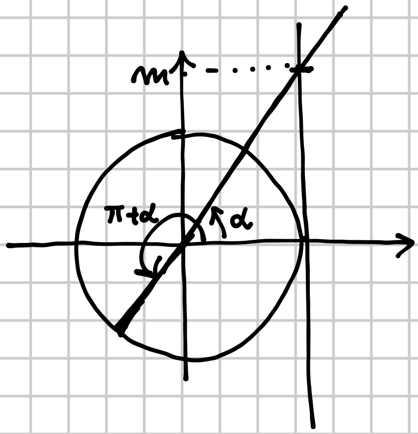
$$= \left\{ \frac{\pi}{6}, -\frac{\pi}{6}, \frac{13}{6}\pi, -\frac{13}{6}\pi, \dots \right\}$$

- $\cos x = \frac{14}{17}$ trovo $\alpha = \arccos\frac{14}{17}$

$$x = \pm\arccos\frac{14}{17} + 2k\pi$$

3) $\tan x = m \qquad m \in \mathbb{R}$

$$x = \arctan(m) + k\pi$$



ESEMPI

- $\tan x = 1$ trovo $\alpha = \arctan(1) = \frac{\pi}{4}$

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

- $\tan x = 2 \qquad \alpha = \arctan(2)$

$$x = \arctan 2 + k\pi$$

20 $2\sin\frac{x}{3}+\sqrt{3}=0$ $\quad[-\pi+6k\pi;\ 4\pi+6k\pi]$

$$2\sin\frac{x}{3}=-\sqrt{3}$$

$$\sin\frac{x}{3}=-\frac{\sqrt{3}}{2}$$

devo trovare α t.c. $\sin\alpha=-\frac{\sqrt{3}}{2}$

$$\alpha=\arcsin\left(-\frac{\sqrt{3}}{2}\right)=-\arcsin\frac{\sqrt{3}}{2}=-\frac{\pi}{3}$$

$$\frac{x}{3}=-\frac{\pi}{3}+2k\pi \quad \vee \quad \frac{x}{3}=\overbrace{\pi-\left(-\frac{\pi}{3}\right)}^{\frac{4}{3}\pi}+2k\pi$$

$$\boxed{x=-\pi+6k\pi \quad \vee \quad x=4\pi+6k\pi}$$

64 $\cos\left(\frac{\pi}{9}-x\right)=0$ $\quad\left[\frac{11}{18}\pi+k\pi\right]$

$$\alpha=\arccos 0=\frac{\pi}{2} \implies \frac{\pi}{9}-x=\pm\frac{\pi}{2}+2k\pi$$

$$\Downarrow$$

$$\frac{\pi}{9}-x=\frac{\pi}{2}+2k\pi \quad \vee \quad \frac{\pi}{9}-x=-\frac{\pi}{2}+2k\pi$$

$$-x=\frac{\pi}{2}-\frac{\pi}{9}+2k\pi \quad \vee \quad -x=-\frac{\pi}{2}-\frac{\pi}{9}+2k\pi$$

$$-x=\frac{7\pi}{18}+2k\pi \quad \vee \quad -x=\frac{-11\pi}{18}+2k\pi$$

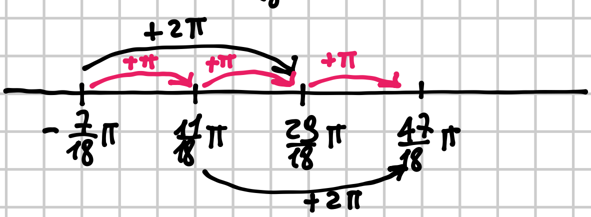
LASCIO IL +

$$x=-\frac{7}{18}\pi+2k\pi \quad \vee \quad x=\frac{11}{18}\pi+2k\pi$$

perché k varia in $\mathbb{Z}$

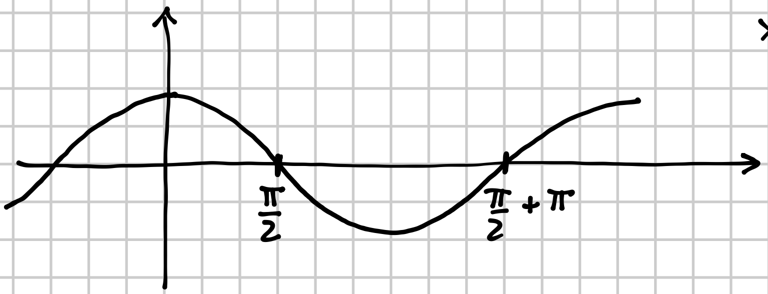
Questo insieme è uguale a $x=\frac{11}{18}\pi+k\pi$. Infatti, scegliendo $k=-1$

$$\frac{11}{18}\pi-\pi=-\frac{7}{18}\pi$$



Infatti $\cos x = 0$ $\qquad x = \frac{\pi}{2} + 2k\pi \quad \vee \quad x = -\frac{\pi}{2} + 2k\pi$

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



$$\cos\left(\frac{\pi}{9} - x\right) = 0 \implies \frac{\pi}{9} - x = \frac{\pi}{2} + k\pi \implies x = \frac{\pi}{9} - \frac{\pi}{2} + k\pi$$

$$x = \frac{2-9}{18}\pi + k\pi$$

$$\boxed{x = -\frac{7}{18}\pi + k\pi}$$