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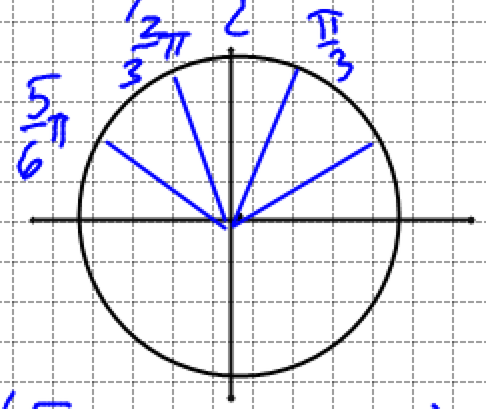
Risolvere la seguente identità:

$$\cos\left(\frac{\pi}{3}-\alpha\right)-\operatorname{sen}\left(\frac{2}{3}\pi+\alpha\right)+2\cos\left(\alpha+\frac{\pi}{3}\right)-\cos\left(\frac{5}{6}\pi+\alpha\right)=\frac{3\cos\alpha-(\sqrt{3}-2)\operatorname{sen}\alpha}{2}$$

$$\cos\frac{\pi}{3}\cos\alpha+\operatorname{sen}\frac{\pi}{3}\operatorname{sen}\alpha-\left(\operatorname{sen}\frac{2}{3}\pi\cos\alpha+\cos\frac{2}{3}\pi\operatorname{sen}\alpha\right)+2\left(\cos\alpha\cos\frac{\pi}{3}-\operatorname{sen}\alpha\operatorname{sen}\frac{\pi}{3}\right)-$$

$$-\left(\cos\frac{5}{6}\pi\cos\alpha-\operatorname{sen}\frac{5}{6}\pi\operatorname{sen}\alpha\right)=\frac{3}{2}\cos\alpha-\frac{\sqrt{3}-2}{2}\operatorname{sen}\alpha$$



$$\frac{1}{2}\cos\alpha+\frac{\sqrt{3}}{2}\operatorname{sen}\alpha-\left(\frac{\sqrt{3}}{2}\cos\alpha-\frac{1}{2}\operatorname{sen}\alpha\right)+2\left(\frac{1}{2}\cos\alpha-\frac{\sqrt{3}}{2}\operatorname{sen}\alpha\right)-$$

$$-\left(-\frac{\sqrt{3}}{2}\cos\alpha-\frac{1}{2}\operatorname{sen}\alpha\right)=\frac{3}{2}\cos\alpha-\frac{\sqrt{3}-2}{2}\operatorname{sen}\alpha$$

$$\frac{1}{2}\cos\alpha+\frac{\sqrt{3}}{2}\operatorname{sen}\alpha-\cancel{\frac{\sqrt{3}}{2}\cos\alpha}+\frac{1}{2}\operatorname{sen}\alpha+\cos\alpha-\sqrt{3}\operatorname{sen}\alpha+\cancel{\frac{\sqrt{3}}{2}\cos\alpha}+\frac{1}{2}\operatorname{sen}\alpha=$$

$$=\frac{3}{2}\cos\alpha-\frac{\sqrt{3}-2}{2}\operatorname{sen}\alpha$$

$$\frac{3}{2}\cos\alpha+\operatorname{sen}\alpha-\frac{\sqrt{3}}{2}\operatorname{sen}\alpha=\frac{3}{2}\cos\alpha-\frac{\sqrt{3}}{2}\operatorname{sen}\alpha+\operatorname{sen}\alpha$$

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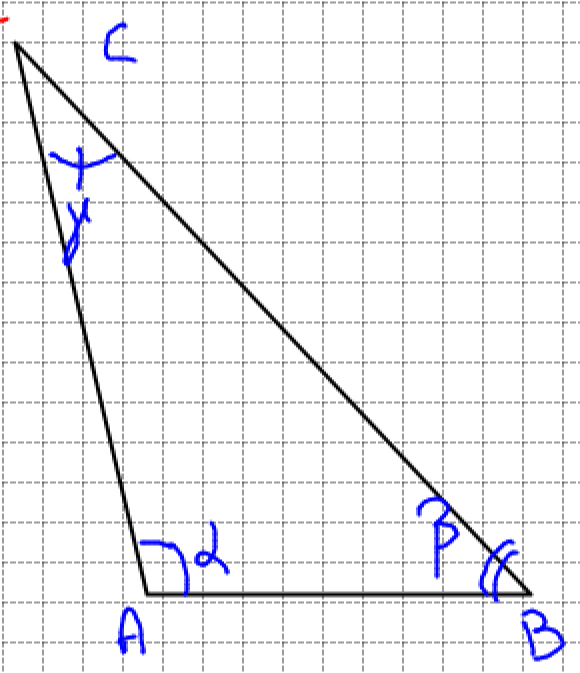


$$\beta=\frac{\pi}{4}$$

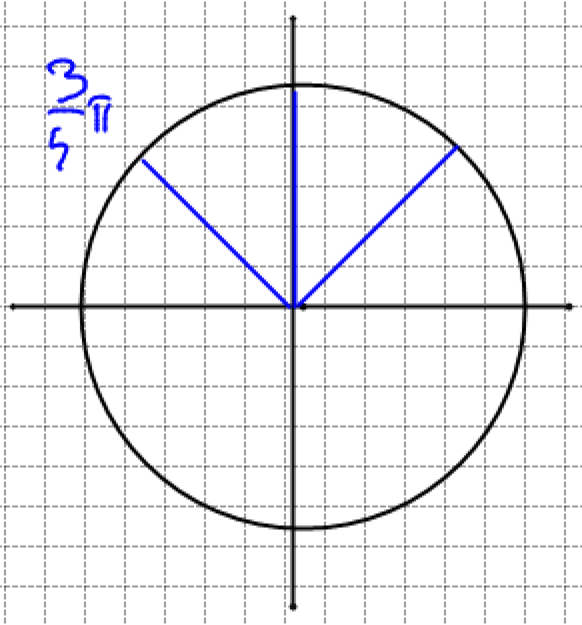
$$\cos\alpha=-\frac{1}{5}\qquad\frac{\pi}{2}<\alpha<\pi$$

$$\alpha+\underbrace{\beta}_{\frac{\pi}{4}}+\gamma=\pi\qquad\alpha+\gamma=\pi-\frac{\pi}{4}\qquad\alpha+\gamma=\frac{3}{4}\pi$$

$$\alpha=\frac{3}{4}\pi-\gamma\qquad\cos\alpha=\cos\left(\frac{3}{4}\pi-\gamma\right)$$

$$-\frac{1}{5}=\cos\left(\frac{3}{4}\pi-\gamma\right)$$

$$-\frac{1}{5}=\cos\frac{3}{4}\pi\cos\gamma+\operatorname{sen}\frac{3}{4}\pi\operatorname{sen}\gamma$$



$$\begin{cases}-\frac{1}{5}=-\frac{\sqrt{2}}{2}\cos\gamma+\frac{\sqrt{2}}{2}\operatorname{sen}\gamma\\ \operatorname{sen}^2\gamma+\cos^2\gamma=1\end{cases}$$

$$\begin{cases}-\frac{\sqrt{2}}{2}\cos\gamma+\frac{\sqrt{2}}{2}\sqrt{1-\cos^2\gamma}=-\frac{1}{5}\\ \operatorname{sen}\gamma=+\sqrt{1-\cos^2\gamma}\end{cases}$$

+ perché γ è angolo di un triango che ha un angolo $>\frac{\pi}{2}$ quindi $\gamma<\frac{\pi}{2}$

$$\frac{1}{2}(1-\cos^2\gamma)=\frac{1}{25}+\frac{1}{2}\cos^2\gamma-\frac{\sqrt{2}}{5}\cos\gamma$$

$$\frac{1}{2}-\frac{1}{2}\cos^2\gamma-\frac{1}{2}\cos^2\gamma+\frac{\sqrt{2}}{5}\cos\gamma-\frac{1}{25}=0$$

$$-\cos^2\gamma+\frac{\sqrt{2}}{5}\cos\gamma+\frac{23}{50}=0$$

$$-\cos^2\gamma + \frac{\sqrt{2}}{5}\cos\gamma + \frac{23}{50} = 0$$

48	2
24	2
12	2
6	2
3	3
1	

$$\cos\gamma = \frac{-\frac{\sqrt{2}}{5} \pm \sqrt{\frac{2}{25} + \frac{46}{25}}}{-2} = \begin{cases} \dfrac{-\frac{\sqrt{2}}{5} - \frac{4\sqrt{3}}{5}}{-2} \\[2ex] \dfrac{-\frac{\sqrt{2}}{5} + \frac{4\sqrt{3}}{5}}{-2} \end{cases}$$

$$\cos\gamma_1 = \frac{\sqrt{2}+4\sqrt{3}}{10} \quad \text{SI}$$

$$\cos\gamma_2 = \frac{\sqrt{2}-4\sqrt{3}}{10} \quad \text{NO} \qquad \operatorname{sen}\gamma_2 = \pm\sqrt{1-\cos^2\gamma_2}$$