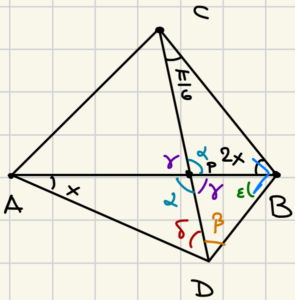
Pag 948 n 211



$C\hat{B}A = 2x$

$CB = 2$

$B\hat{A}D = x$

$C\hat{B}D = \frac{\pi}{2}$

$P\hat{C}B = \frac{\pi}{6}$

Trova $AD = ?$

Risolvi $AD > \frac{2\sqrt{3}}{3}$

$\alpha \rightsquigarrow \beta \rightsquigarrow \gamma \rightsquigarrow \delta \rightsquigarrow \varepsilon \rightsquigarrow$ Risolvo $P\hat{B}C \rightsquigarrow$ Risolvo $P\hat{B}D$ $\rightsquigarrow$ risolvo $A\hat{P}D \rightsquigarrow AD$

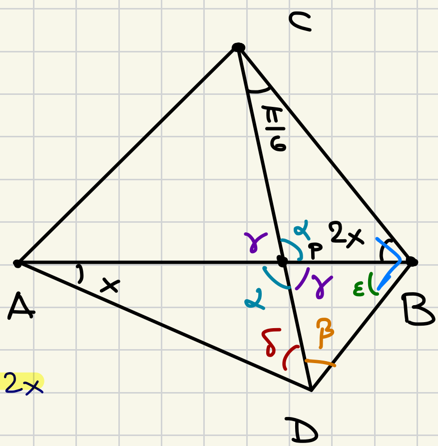
$$\alpha = \pi - 2x - \frac{\pi}{6} = \frac{5}{6}\pi - 2x$$

$$\beta = \pi - \frac{\pi}{2} - \frac{\pi}{6} = \frac{\pi}{3}$$

$$\gamma = \pi - \alpha = \pi - \frac{5}{6}\pi + 2x = \frac{\pi}{6} + 2x$$

$$\delta = \pi - x - \alpha = \frac{\pi}{6} + x$$

$$\varepsilon = \pi - \gamma - \beta = \pi - \frac{\pi}{6} - 2x - \frac{\pi}{3} = \frac{\pi}{2} - 2x$$



$$BD = BC \cdot tg\frac{\pi}{6}$$

$AD \rightsquigarrow$ Teorema del seno : $\frac{AD}{\sin\varepsilon} = \frac{BD}{\sin x} \rightsquigarrow AD = BD \cdot \frac{\sin\varepsilon}{\sin x}$

$$AD = BC \cdot tg\frac{\pi}{6} \cdot \frac{\sin(\frac{\pi}{2} - 2x)}{\sin x} = 2 \cdot \frac{\sqrt{3}}{3} \cdot \frac{\cos 2x}{\sin x}$$

$$\boxed{AD = 2\frac{\sqrt{3}}{3} \cdot \frac{\cos 2x}{\sin x}}$$

D) $\quad 2\cancel{\frac{\sqrt{3}}{3}}\,\frac{\cos 2x}{\sin x} > 2\cancel{\frac{\sqrt{3}}{3}} \qquad \frac{\cos 2x}{\sin x} > 1$

$$\frac{\cos 2x - \sin x}{\sin x} > 0$$

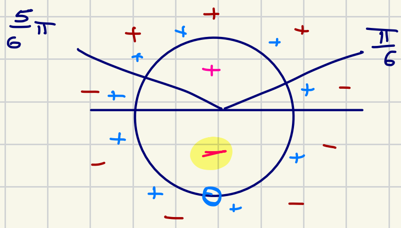
$\underline{N>0}$: $\quad \cos 2x - \sin x > 0$

$1 - 2\sin^2 x - \sin x > 0$

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

$\Delta = 1 + 8 = 9 \qquad \sqrt{\Delta} = 3$

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

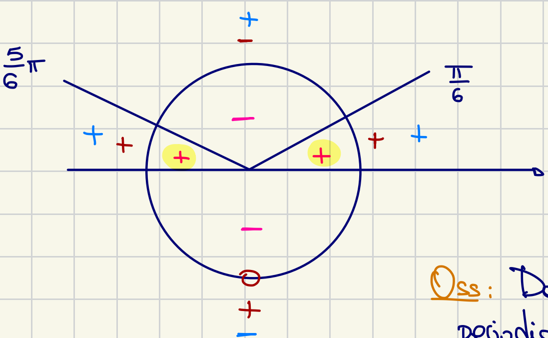


1) $\sin x > -1 \rightsquigarrow x \neq -\frac{\pi}{2} + 2k\pi$

2) $\sin x > \frac{1}{2} \rightsquigarrow \frac{\pi}{6} + 2k\pi < x < \frac{5}{6} + 2k\pi$

Siamo interessati al "$-$" $\quad$ N) $\boxed{-\frac{7}{6}\pi + 2k\pi < x < \frac{\pi}{6} + 2k\pi \quad \text{con} \quad x \neq -\frac{\pi}{2} + 2k\pi}$

$D>0 \qquad \sin x > 0 \qquad$ D) $\boxed{2k\pi < x < \pi + 2k\pi}$



$$\boxed{\underline{\text{Sol}}: \quad 2k\pi < x < \frac{\pi}{6} + 2k\pi \ \vee \ \frac{5}{6}\pi + 2k\pi < x < \pi + 2k\pi}$$

Oss: Dato che x è un angolo vero le periodicità lasciano un po' il tempo che trovano e inoltre ci sono C.E su x

In particolare in questo problema $2x < \frac{\pi}{2} \rightsquigarrow 0 < x < \frac{\pi}{4}$ e mettendo a sistema ottengo $\boxed{0 < x < \frac{\pi}{6}}$