



RISOLVENDO RISULTERÀ :  $\alpha = 60^\circ$  e  $x = 145,36$

EQUAZIONE 1:

$$135,88 = 20 - 20 \cos \alpha + x \sin(60^\circ)$$

EQUAZIONE 2:

$$110 = 20 + 20 \sin \alpha + x \cos(60^\circ)$$

RISOLVENDO RISULTA:

$$\begin{cases} 115,88 = x \frac{\sqrt{3}}{2} - 20 \cos \alpha \\ 90 = 20 \sin \alpha + \frac{x}{2} \end{cases}$$

$$\begin{cases} x \frac{\sqrt{3}}{2} - 20 \cos \alpha = 115,88 & \cdot 1 \\ \frac{x}{2} + 20 \sin \alpha = 90 & \cdot \sqrt{3} \end{cases} \Rightarrow \begin{cases} x \frac{\sqrt{3}}{2} - 20 \cos \alpha = 115,88 \\ -\frac{\sqrt{3}}{2} x - \sqrt{3} 20 \sin \alpha = -\sqrt{3} 90 \end{cases}$$

$$\begin{aligned} -20 \cos \alpha - \sqrt{3} 20 \sin \alpha &= 115,88 - \sqrt{3} 90 \\ &= \underbrace{115,88 - 152,922}_{-40,004} \approx -40 \end{aligned}$$

RISULTA:

$$-20 \cos \alpha = +20\sqrt{3} \sin \alpha - 40 \Rightarrow \frac{-20}{20} \Rightarrow -\cos \alpha = \sqrt{3} \sin \alpha - 2$$

$$\boxed{2 = \sqrt{3} \sin \alpha + \cos \alpha} \Rightarrow \text{se } \sin^2 \alpha + \cos^2 \alpha = 1 \Rightarrow \cos^2 \alpha = 1 - \sin^2 \alpha$$
$$\Downarrow$$
$$\cos \alpha = \sqrt{1 - \sin^2 \alpha}$$

sostituendo:

$$2 = \sqrt{3} \sin \alpha + \sqrt{1 - \sin^2 \alpha} \Rightarrow 2 - \sqrt{3} \sin \alpha = \sqrt{1 - \sin^2 \alpha}$$

$$\text{PONENDO } x = \sin \alpha \Rightarrow 2 - \sqrt{3} x = \sqrt{1 - x^2} \Rightarrow (2 - \sqrt{3} x)^2 = (\sqrt{1 - x^2})^2$$

$$4 + 3x^2 - 4\sqrt{3}x = 1 - x^2 \Rightarrow 4x^2 - 4\sqrt{3}x = -3 \Rightarrow \text{RISOLVENDO RISULTA}$$

$$\text{CHE } 4x^2 - 4\sqrt{3}x + 3 = 0 \Rightarrow x = \frac{\sqrt{3}}{2} \Rightarrow \text{se } \sin \alpha = \frac{\sqrt{3}}{2} \Rightarrow \alpha = 60^\circ$$