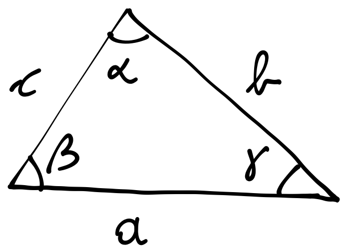
3/12/2018

**190** $a = 12\sqrt{2}$, $\beta = 60°$, $\gamma = 45°$. $b$? $c$?

Risolvere il triangolo




$b = ?$ $\alpha = ?$

$c = ?$

$$\alpha = 180° - (60° + 45°) = 75°$$

TH. SENI $\Rightarrow$ $$\frac{a}{\sin\alpha} = \frac{b}{\sin\beta} \Rightarrow b = \frac{a}{\sin\alpha}\cdot\sin\beta =$$

$$= \frac{\overset{6}{\cancel{12}}\sqrt{2}}{\frac{\sqrt{2}+\sqrt{6}}{4}}\cdot\frac{\sqrt{3}}{\cancel{2}} = \frac{6\sqrt{6}\cdot 4}{\sqrt{2}+\sqrt{6}} =$$

$$= \frac{24\sqrt{6}}{\sqrt{2}+\sqrt{6}}\cdot\frac{\sqrt{6}-\sqrt{2}}{\sqrt{6}-\sqrt{2}} = \frac{24(6-\sqrt{12})}{6-2} =$$

$$= \frac{\overset{6}{\cancel{24}}(6-2\sqrt{3})}{\underset{1}{\cancel{4}}} = 36 - 12\sqrt{3} = \boxed{12(3-\sqrt{3})}$$

$$\sin 75° = \sin(30° + 45°) =$$

$$= \sin 30°\cos 45° + \sin 45°\cos 30° =$$

$$= \frac{1}{2}\cdot\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}\cdot\frac{\sqrt{3}}{2} = \frac{\sqrt{2}+\sqrt{6}}{4}$$

$$\frac{c}{\sin\gamma} = \frac{a}{\sin\alpha} \Rightarrow c = \frac{a}{\sin\alpha}\cdot\sin\gamma =$$

$$= \frac{\overset{6}{\cancel{12}}\sqrt{2}}{\frac{\sqrt{2}+\sqrt{6}}{4}}\cdot\frac{\sqrt{2}}{\cancel{2}} = \frac{24\cdot 2}{\sqrt{6}+\sqrt{2}}\cdot\frac{\sqrt{6}-\sqrt{2}}{\sqrt{6}-\sqrt{2}} =$$

$$= \frac{\overset{12}{\cancel{48}}(\sqrt{6}-\sqrt{2})}{\cancel{4}} = \boxed{12\sqrt{2}(\sqrt{3}-1)}$$

**188** $a = 20, \qquad b = 9, \qquad \alpha = 120°. \qquad \sin\beta?$

$$\frac{a}{\sin\alpha} = \frac{b}{\sin\beta} = \frac{c}{\sin\gamma} \; (= 2R)$$

$$\frac{20}{\sin 120°} = \frac{9}{\sin\beta} \implies \frac{20}{\frac{\sqrt{3}}{2}} = \frac{9}{\sin\beta}$$

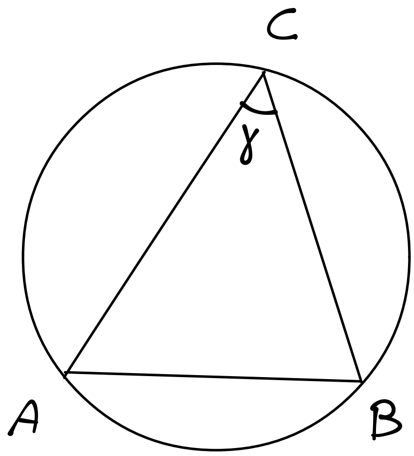
$$\implies \sin\beta = \frac{9 \cdot \frac{\sqrt{3}}{2}}{20} = \frac{9\sqrt{3}}{40}$$

$$\beta = \arcsin\left(\frac{9\sqrt{3}}{40}\right) \quad \vee \quad \underbrace{\beta = 180° - \arcsin\left(\frac{9\sqrt{3}}{40}\right) \simeq 157°}_{\text{NON ACCETTABILE}}$$

$\simeq 22{,}9°$

$\alpha = 120°$

**166** Determina il raggio della circonferenza circoscritta al triangolo $ABC$, sapendo che $AB = 40$ cm e che $\cos A\widehat{C}B = \frac{12}{13}$. [52 cm]




$\overline{AB} = 40$

$\cos\gamma = \frac{12}{13}$

$R = ?$

TH. CORDA

$\overline{AB} = 2R \cdot \sin\gamma$

$$R = \frac{\overline{AB}}{2 \cdot \sin\gamma} = \frac{\overline{AB}}{2\sqrt{1-\cos^2\gamma}} =$$

$$= \frac{40}{2\sqrt{1-\frac{144}{169}}} = \frac{40}{2\sqrt{\frac{169-144}{169}}} =$$

$$= \frac{\cancel{40}^{20}}{\cancel{2}\sqrt{\frac{25}{169}}} = \frac{20}{\frac{5}{13}} = 13 \cdot 4 = \boxed{52}$$