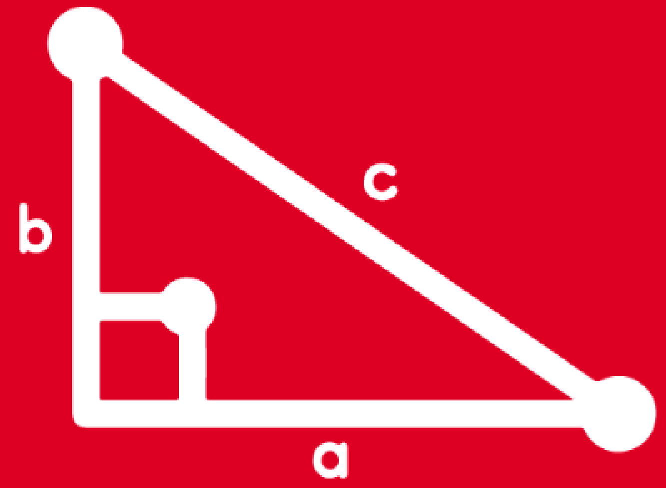
TRIGONOMETRY

VOLUME III

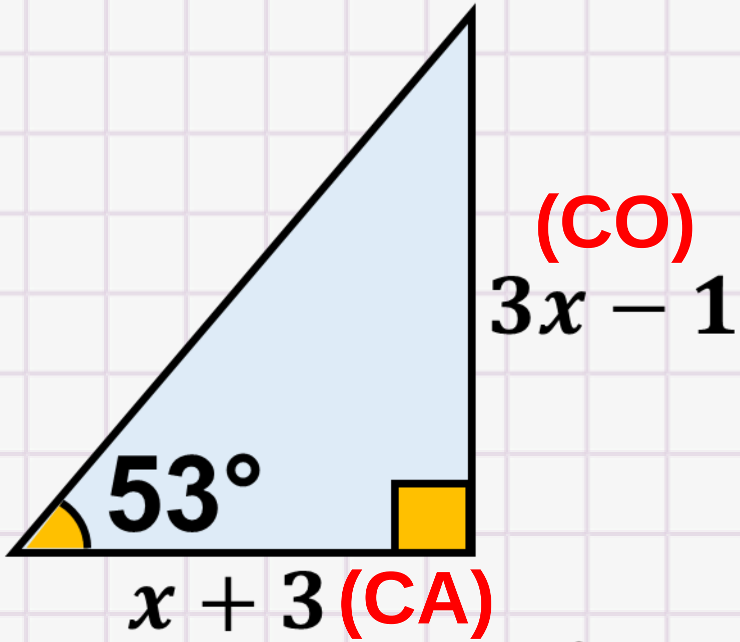


3rd
SECONDARY

FEEDBACK

SACO OLIVEROS

1) **Del gráfico, calcule el valor de x.**



Recordar:

$$\tan\beta = \frac{CO}{CA}$$

RESOLUCIÓN

Del gráfico, definimos:

$$\tan 53° = \frac{3x-1}{x+3}$$

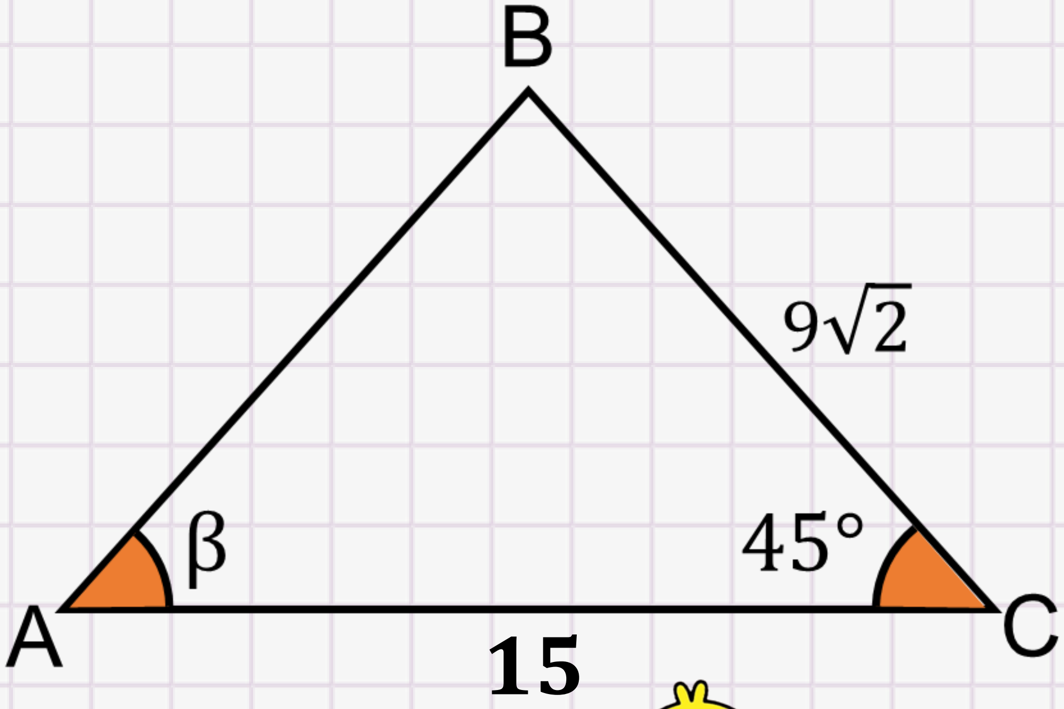
$$\frac{4}{3} = \frac{3x-1}{x+3}$$

$$4x + 12 = 9x - 3$$

$$15 = 5x$$

$$\therefore \boxed{x = 3}$$

2) Del gráfico, calcule el valor de $\cot\beta$.

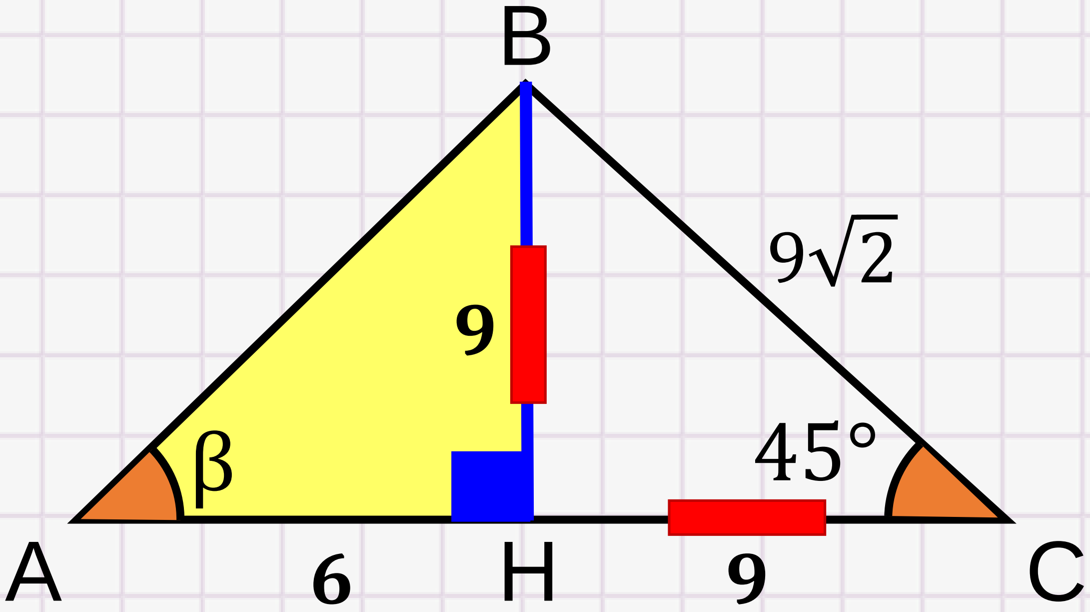


Recordar:

$$\cot\beta = \frac{CA}{CO}$$

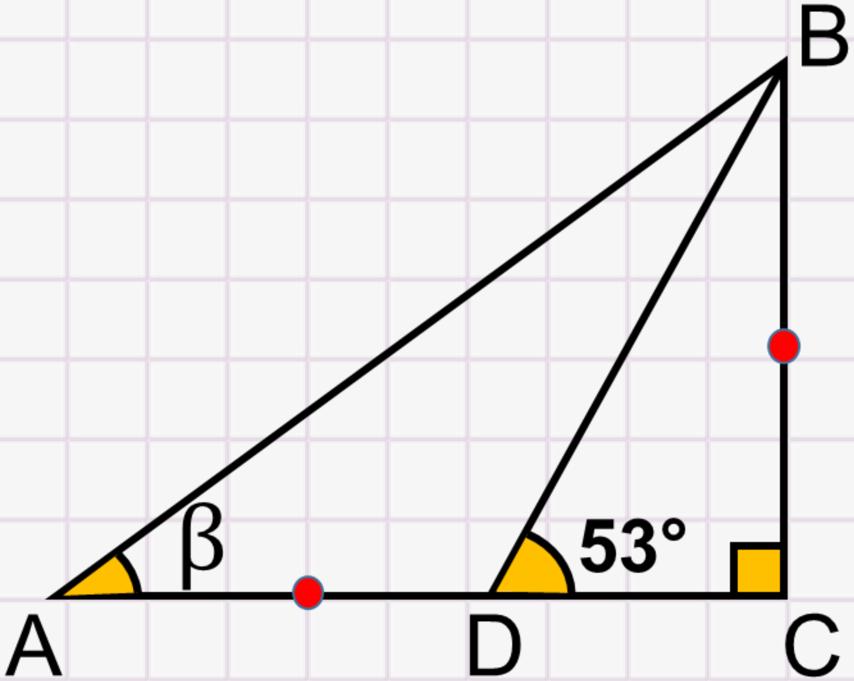
RESOLUCIÓN

Trazamos un altura $BH \perp AC$:



$$\rightarrow \cot\beta = \frac{AH}{BH} = \frac{\cancel{6}}{\cancel{9}} = \boxed{\frac{2}{3}}$$

3) Del gráfico, calcule tanβ.

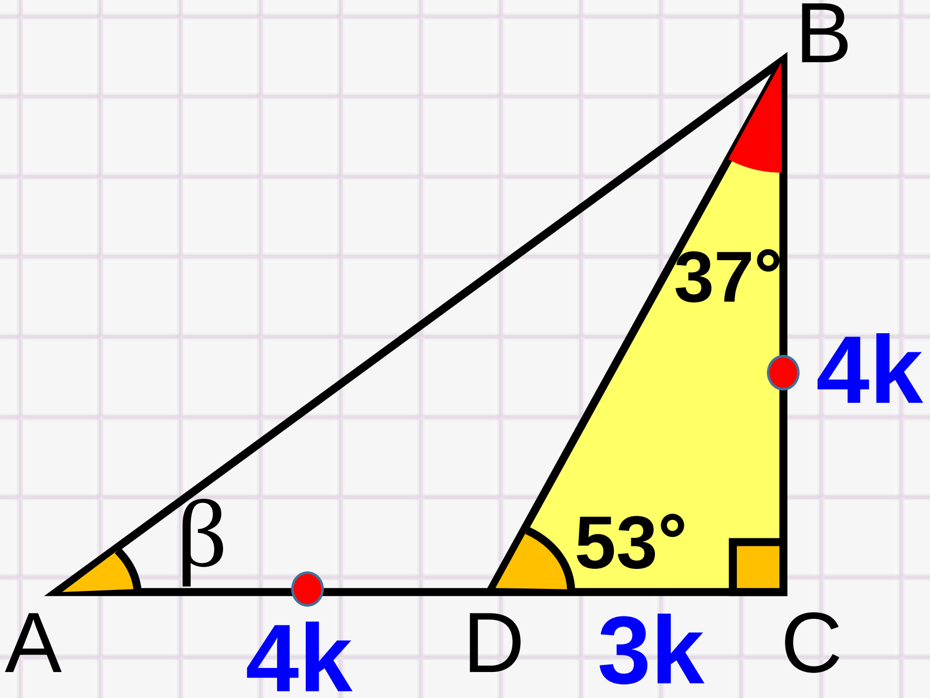


Recordar:

$$\tan\beta = \frac{CO}{CA}$$

RESOLUCIÓN

El ⊿BCD es notable de 37° – 53°



$$\rightarrow \tan\beta = \frac{BC}{AC} = \frac{4k}{4k+3k} = \frac{4\cancel{k}}{7\cancel{k}} \boxed{= \frac{4}{7}}$$

4) **Si θ es la medida de un ángulo agudo tal que cumple**

$$\tan\theta = \frac{2\text{sen}20° + 3\cos70°}{3\cos70° - \text{sen}20°}$$

efectúe $\mathbf{P = \sec\theta \cdot \csc\theta}$**.**

Recordar:

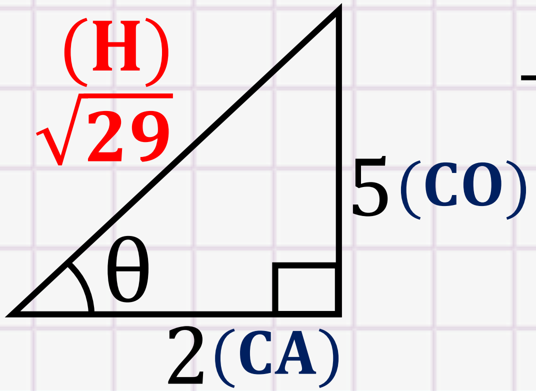
Si $\alpha + \beta = 90° \rightarrow \text{sen}\alpha = \cos\beta$

RESOLUCIÓN

Por RT de ángulos complementarios: $\text{sen}20° = \cos70°$

$$\rightarrow \tan\theta = \frac{2\cos70° + 3\cos70°}{3\cos70° - \cos70°}$$

$$\tan\theta = \frac{5\cancel{\cos70°}}{2\cancel{\cos70°}} = \frac{5}{2} \begin{matrix} \rightarrow \text{CO} \\ \rightarrow \text{CA} \end{matrix}$$



$$\rightarrow G = \left(\frac{\sqrt{29}}{2}\right)\left(\frac{\sqrt{29}}{5}\right)$$

$$\therefore \boxed{G = \frac{29}{10}}$$

5) **Calcule el valor de $\tan(73° - x)$ si**

$$\mathbf{\cos(2x + 20°) = sen(4x - 50°)}$$

RESOLUCIÓN

Por RT de ángulos complementarios:

Recordar:

Si $\alpha + \beta = 90° \rightarrow \text{sen}\alpha = \cos\beta$

$$2x + 20° + 4x - 50° = \mathbf{90°}$$

$$6x - 30° = \mathbf{90°}$$

$$6x = 120°$$

$$\boxed{x = 20°}$$

Calculamos $\tan(73° - x)$

$$\tan(73° - \mathbf{20°})$$

$$\tan 53° \boxed{= \frac{\mathbf{4}}{\mathbf{3}}}$$

6) **Si β es la medida de un ángulo agudo tal que cumple**

$$\tan\beta = \frac{6\operatorname{sen}40° \cdot \operatorname{sen}30°}{\sqrt{2}\cos 50° \cdot \sec 45°}$$

efectúe $G = \sqrt{13}\cos\beta$.

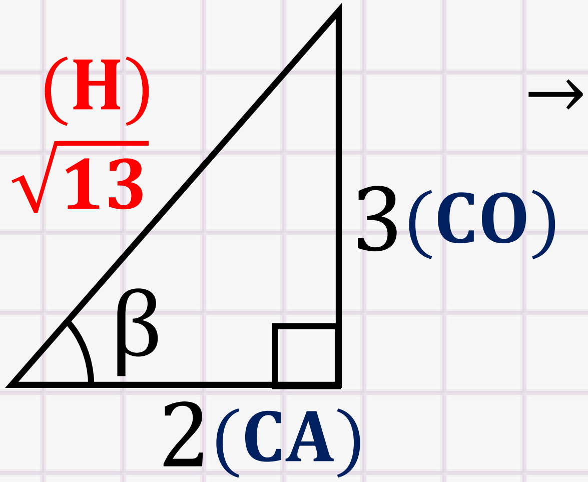
Recordar:

$\text{Si } \alpha + \beta = 90° \rightarrow \operatorname{sen}\alpha = \cos\beta$

RESOLUCIÓN

Por RT de ángulos complementarios: $\operatorname{sen}40° = \cos 50°$

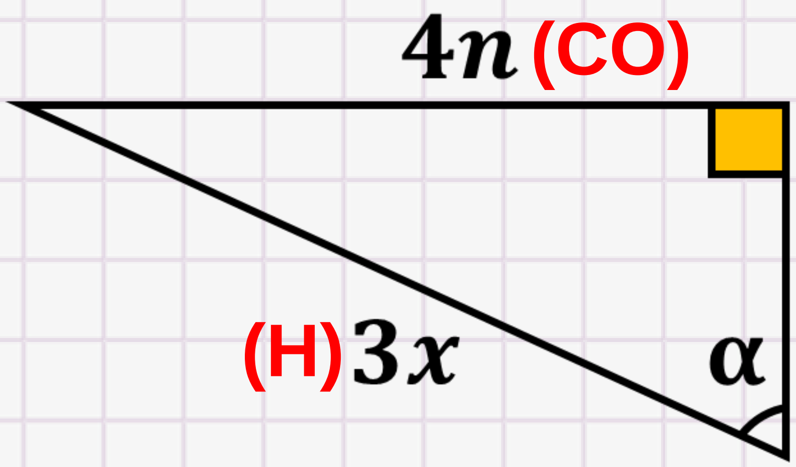
$$\rightarrow \tan\beta = \frac{6\cancel{\cos 50°} \cdot \left(\frac{1}{2}\right)}{\sqrt{2}\cancel{\cos 50°} \cdot \sqrt{2}} = \frac{3}{2} \begin{matrix} \rightarrow \text{CO} \\ \rightarrow \text{CA} \end{matrix}$$



$$\rightarrow G = \cancel{\sqrt{13}}\left(\frac{2}{\cancel{\sqrt{13}}}\right)$$

$\therefore \boxed{G = 2}$

7) Del gráfico, calcule el valor de x en términos de α y n.



Recordar:

$$\frac{\text{LO QUE QUIERO}}{\text{LO QUE TENGO}} = \text{RT}(\theta)$$

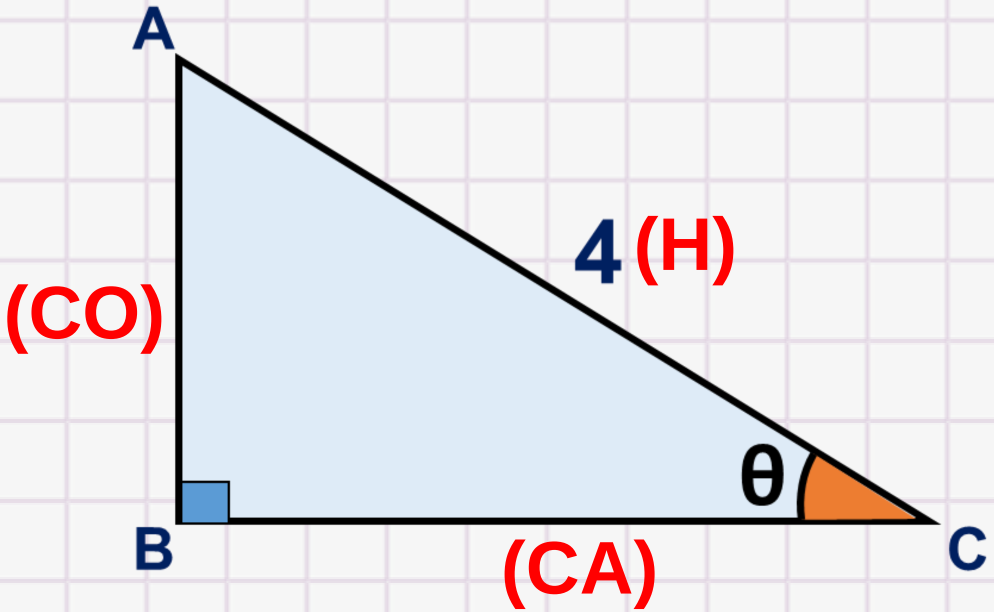
RESOLUCIÓN

$$\rightarrow \frac{3x}{4n} = \csc\alpha$$

$$3x = 4n \cdot \csc\alpha$$

$$\therefore \boxed{x = \frac{4n \cdot \csc\alpha}{3}}$$

8) **Del gráfico, calcule el perímetro del triángulo ABC, en términos de θ.**



Recordar:

$$\frac{\text{LO QUE QUIERO}}{\text{LO QUE TENGO}} = RT(\theta)$$

RESOLUCIÓN

$$\frac{AB}{4} = \text{sen}\theta \Rightarrow \boxed{AB = 4\text{sen}\theta}$$

$$\frac{BC}{4} = \cos\theta \Rightarrow \boxed{BC = 4\cos\theta}$$

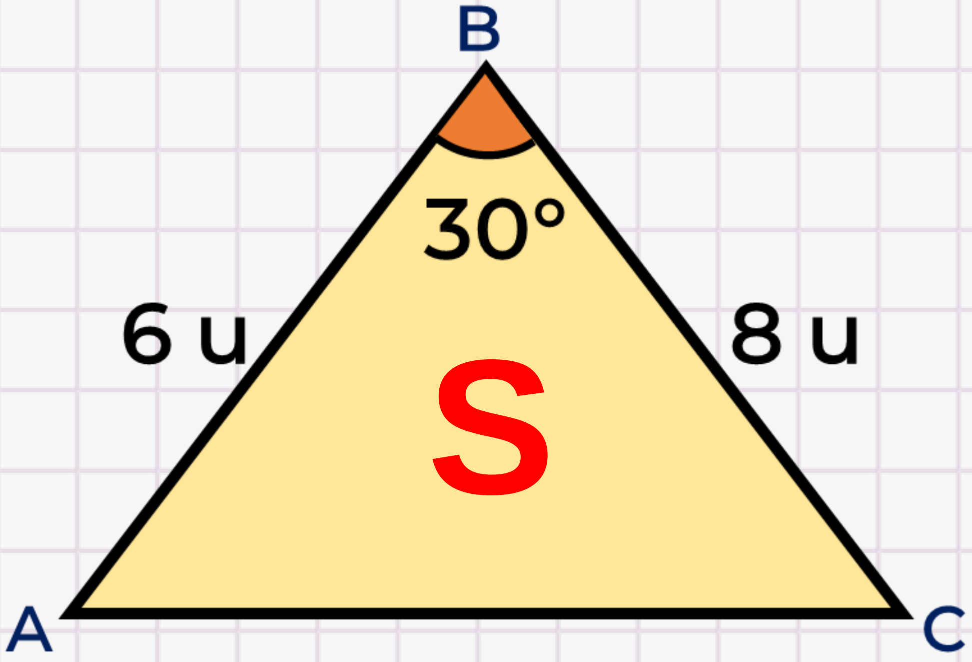
Calculamos:

$$2p = AB + BC + AC$$

$$2p = 4\text{sen}\theta + 4\cos\theta + 4$$

$$\therefore \boxed{2p = 4(\text{sen}\theta + \cos\theta + 1)}$$

9) **Del gráfico, calcule el área de la región triangular ABC.**



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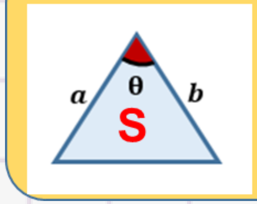


$$S = \frac{a.b}{2}\,\text{sen}\theta$$

RESOLUCIÓN

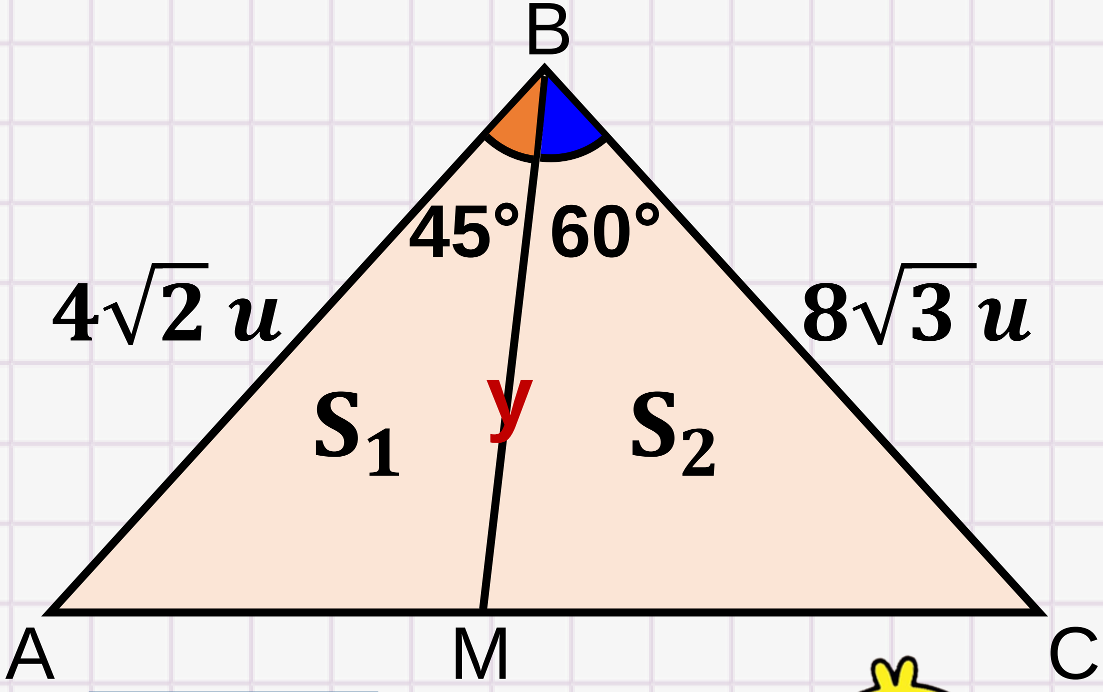
Sea S el área de la región triangular ABC.

$$\rightarrow S = \frac{6 \cdot 8}{2}\,\text{sen}30°$$

$$S = 24 \cdot \frac{1}{2}$$

$$\therefore \boxed{S = 12\ \text{u}^2}$$

10) **Del gráfico, calcule $\frac{S_1}{S_2}$ si S_1 y S_2 son áreas.**



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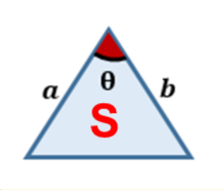

$$S = \frac{a.b}{2}\,\text{sen}\theta$$

RESOLUCIÓN

Sea $BM = y$

$$\rightarrow \frac{S_1}{S_2} = \frac{\cancel{\dfrac{4\sqrt{2}\cdot y}{2}}\cdot \text{sen}45°}{\cancel{\dfrac{8\sqrt{3}\cdot y}{2}}\cdot \text{sen}60°}$$

$$\frac{S_1}{S_2} = \frac{4\cancel{\sqrt{2}}\cdot\dfrac{\cancel{\sqrt{2}}}{\cancel{2}}}{\overset{2}{\cancel{8}}\sqrt{3}\cdot\dfrac{\sqrt{3}}{\underset{1}{\cancel{2}}}} = \frac{\overset{2}{\cancel{4}}}{\underset{3}{\cancel{6}}} \boxed{= \frac{2}{3}}$$

SACO
OLIVEROS