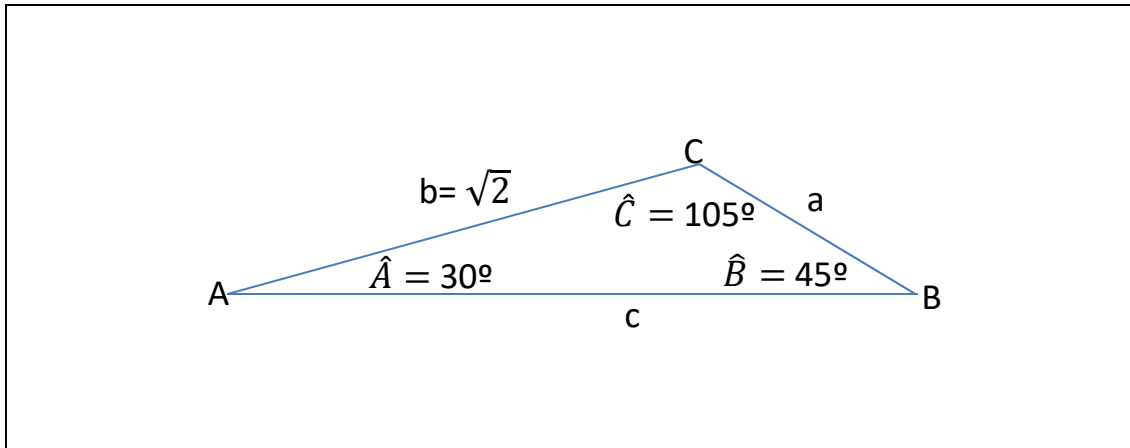


PROBLEMAS DE TRIGONOMETRÍA

Problema 210:

Resolver un triángulo, sin recurrir a las tablas de logaritmos, en el que conocemos $\hat{A} = 30^\circ$; $\hat{B} = 45^\circ$ y $b = \sqrt{2}$.

Solución Problema 210:



Sabemos que:

$$180^\circ = 30^\circ + 45^\circ + C$$

$$C = 180^\circ - (30^\circ + 45^\circ) = 105^\circ$$

Aplicamos el teorema del seno para calcular el lado "a":

$$\frac{a}{\text{sen } A} = \frac{b}{\text{sen } B}$$

$$\frac{a}{\text{sen } 30^\circ} = \frac{\sqrt{2}}{\text{sen } 45^\circ}$$

$$a = \frac{\text{sen } 30^\circ \cdot \sqrt{2}}{\text{sen } 45^\circ} = \frac{\frac{1}{2} \cdot \sqrt{2}}{\frac{\sqrt{2}}{2}} = 1$$

Calculamos el lado "c", para ello:

$$\text{sen } 105^\circ = \text{sen } (180^\circ - 75^\circ) = \text{sen } 75^\circ$$

$$\text{sen } 75^\circ = \text{sen } (30^\circ + 45^\circ) = \text{sen } 30^\circ \cdot \cos 45^\circ + \cos 30^\circ \cdot \text{sen } 45^\circ$$

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

Aplicamos el teorema del seno para calcular "c":

$$\frac{b}{\text{sen } B} = \frac{c}{\text{sen } C}$$

$$\frac{\sqrt{2}}{\text{sen } 45^\circ} = \frac{c}{\text{sen } 75^\circ}$$

$$c = \frac{\text{sen } 75^\circ \cdot \sqrt{2}}{\text{sen } 45^\circ} = \frac{\frac{\sqrt{2} + \sqrt{6}}{4} \cdot \sqrt{2}}{\frac{\sqrt{2}}{2}} = \frac{\sqrt{2} + \sqrt{6}}{2}$$