

Problema 838

Resolver el triángulo $\triangle ABC$ conocidos $A = 120^\circ$, $v_a = 2$ bisectriz interior del ángulo A y $b - c = 4$.

Solución de Ricard Peiró:

$$v_a = \frac{2bc}{b+c} \cos \frac{A}{2}.$$

$$2 = \frac{2(4+c)c}{4+c} \frac{1}{2}.$$

$$c^2 = 8.$$

Resolviendo la ecuación:

$$c = 2\sqrt{2}.$$

$$b = 4 + 2\sqrt{2}.$$

Aplicando el teorema del coseno al triángulo $\triangle ABC$:

$$a^2 = (4 + 2\sqrt{2})^2 + (2\sqrt{2})^2 - 2(4 + 2\sqrt{2})(2\sqrt{2})\cos 120^\circ.$$

$$a^2 = 40 + 24\sqrt{2}.$$

$$a = \sqrt{40 + 24\sqrt{2}}.$$

