

Problema 672.

Donat el triangle $\triangle ABC$, siga D el punt mig de $\overline{AC}$.
Si $\angle ABD = 50^\circ$ i $\angle BCD = 40^\circ$, determineu $\angle DBC$.

Solució de Ricard Peiró.

Siga $\alpha = \angle DBC$.

Aplicant el teorema dels sinus al triangle $\triangle BCD$

$$\frac{b}{2\sin \alpha} = \frac{\overline{BD}}{\sin 40^\circ} \quad (1)$$

$$\angle BDA = 40^\circ + \alpha, \angle BAD = 90^\circ - \alpha.$$

Aplicant el teorema dels sinus al triangle $\triangle ABD$:

$$\frac{b}{2\sin 50^\circ} = \frac{\overline{BD}}{\sin 90^\circ - \alpha} \quad (2)$$

Dividint les expressions (1) (2):

$$\frac{\sin 50^\circ}{\sin \alpha} = \frac{\cos \alpha}{\sin 40^\circ}.$$

$$\sin 50^\circ \cdot \sin 40^\circ = \sin \alpha \cdot \cos \alpha.$$

$$2 \cdot \sin 50^\circ \cdot \cos 50^\circ = 2 \sin \alpha \cdot \cos \alpha$$

$$\sin 100^\circ = \sin 2\alpha.$$

$$2\alpha = 100^\circ, 2\alpha = 80^\circ$$

Aleshores, $\alpha = 50^\circ$, o bé $\alpha = 40^\circ$.

