

Problema 931

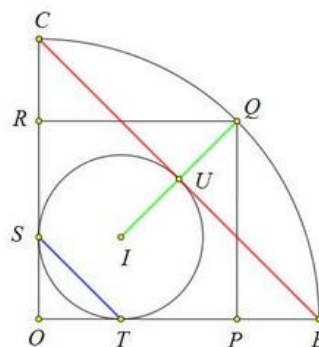
★ $\odot(OBC)$ quarter of circle (O, OB)

★ I incenter of $\triangle OBC$

★ S, T, U touch points

★ $OPBR$ square inscribed in mixtilinear triangle OBC

Prove that: $\frac{1}{BC} + \frac{1}{IQ} = \frac{1}{TS}$



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Solución del director

Sea $OC=OB=1$

$$CB=\sqrt{2}$$

$$OT=OS=1-\frac{\sqrt{2}}{2}=\frac{2-\sqrt{2}}{2}$$

$$TS=\sqrt{3-2\sqrt{2}}=\sqrt{(\sqrt{2}-1)^2}=\sqrt{2}-1$$

$$IQ=OQ-OI=1-TS=1-\sqrt{3-2\sqrt{2}}=2-\sqrt{2}$$

Hemos de ver que

$$\frac{1}{\sqrt{2}} + \frac{1}{2-\sqrt{2}} = \frac{1}{\sqrt{2}-1}, \text{ o bien}$$

$$\frac{2-\sqrt{2}}{2\sqrt{2}-2} + \frac{\sqrt{2}}{2\sqrt{2}-2} = \frac{2}{2\sqrt{2}-2} = \frac{1}{\sqrt{2}-1}$$

Lo que queríamos demostrar.

Ricardo Barroso Campos . Jubilado.

Sevilla. España