Proof Without Words: One Elegant Relationship Between the Angles Formed in an Acute Triangle

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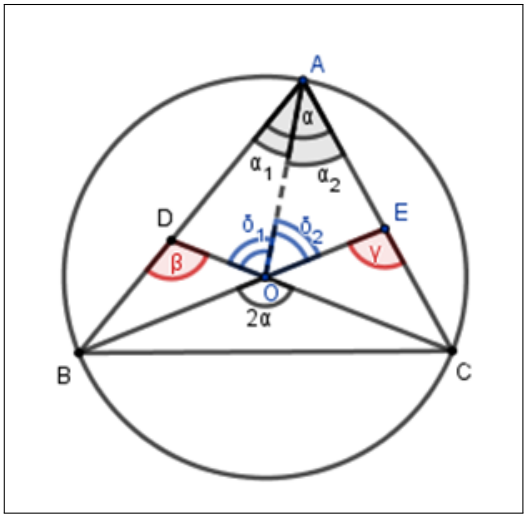
Assumptions

Let cevians $\overline{BE}$ and $\overline{CD}$ of acute triangle $\triangle ABC$ are meeting at its circumcenter O. Denote angles $\angle BAC$, $\angle BDC$, and $\angle BEC$ by α, β, γ respectively. Then

$$\beta + \gamma = 3\alpha$$

Proof



$$\beta + \gamma = (\alpha_1 + \delta_1) + (\alpha_2 + \delta_2) = \alpha + 2\alpha = 3\alpha \quad \blacksquare$$

References

Nelsen, R.B. (1993). *Proofs without words: Exercise in visual thinking*. New York: The Mathematical Association of America.

Nelsen, R.B. (2000). *Proofs without words II: More exercise in visual thinking*. New York: The Mathematical Association of America.