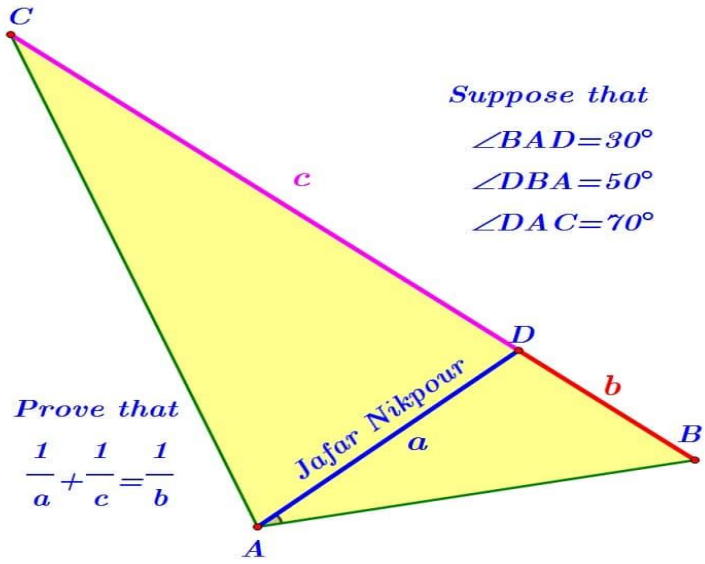
ROMANIAN MATHEMATICAL MAGAZINE



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Solution by Daniel Sitaru-Romania

$$\text{In } \Delta ADB: m(\sphericalangle ADB) = 180° - 30° - 50° = 100°$$

$$\text{In } \Delta ADC: m(\sphericalangle ADC) = 180° - 100° = 80°,\ m(\sphericalangle DCA) = 180° - 80° - 70° = 30°$$

$$\text{In } \Delta ADB:$$

$$\frac{a}{sin50°} = \frac{b}{sin30°} \Rightarrow b = \frac{asin30°}{sin50°}$$

$$\text{In } \Delta ADC:$$

$$\frac{a}{sin30°} = \frac{c}{sin70°} \Rightarrow c = \frac{asin70°}{sin30°}$$

$$\frac{1}{a} + \frac{1}{c} = \frac{1}{b} \Leftrightarrow \frac{1}{a} + \frac{1}{\frac{asin70°}{sin30°}} = \frac{1}{\frac{asin30°}{sin50°}} \Leftrightarrow 1 + \frac{sin30°}{sin70°} = \frac{sin50°}{sin30°}$$

$$sin70° \cdot sin30° + sin30° \cdot sin30° = sin50° \cdot sin70°$$

$$sin30°(sin70° + sin30°) = sin50° \cdot sin(90° - 20°)$$

$$\frac{1}{2} \cdot 2sin\frac{70° + 30°}{2} cos\frac{70° + 30°}{2} = sin50°cos20°$$

$$sin50°cos20° = sin50°cos20°$$