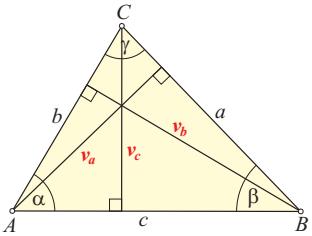
Zadatak 17. Duljine visina trokuta jednake su 8 cm, 12 cm i 18 cm. Kolike su duljine stranica i koliki su kutovi ovog trokuta?

Rješenje.

$v_a = 8\,\text{cm}$

$v_b = 12\,\text{cm}$

$v_c = 18\,\text{cm}$



$a,\ b,\ c,\ \alpha,\ \beta,\ \gamma = ?$

$v_a : v_b : v_c = c : b : a = 8 : 12 : 18 = 4 : 6 : 9$

$\Longrightarrow\ a : b : c = 9 : 6 : 4$

$\Longrightarrow\ \sin\alpha : \sin\beta : \sin\gamma = 9 : 6 : 4$

$a = 9x, \quad b = 6x, \quad c = 4x$

$$\cos\alpha = \frac{b^2 + c^2 - a^2}{2bc} = \frac{36x^2 + 16x^2 - 81x^2}{2 \cdot 6x \cdot 4x} = \frac{-29x^2}{48x^2} = -\frac{29}{48} \Longrightarrow \alpha = 127°10'8''$$

$$\cos\beta = \frac{a^2 + c^2 - b^2}{2ac} = \frac{81x^2 + 16x^2 - 36x^2}{2 \cdot 9x \cdot 4x} = \frac{61x^2}{72x^2} = \frac{61}{72} \Longrightarrow \beta = 32°5'21''$$

$\gamma = 180° - \alpha - \beta = 20°44'31''$

$$a = \frac{v_b}{\sin\gamma} = 33.88\,\text{cm}$$

$$b = \frac{v_c}{\sin\alpha} = 22.59\,\text{cm}$$

$$c = \frac{v_a}{\sin\beta} = 15.06\,\text{cm}$$