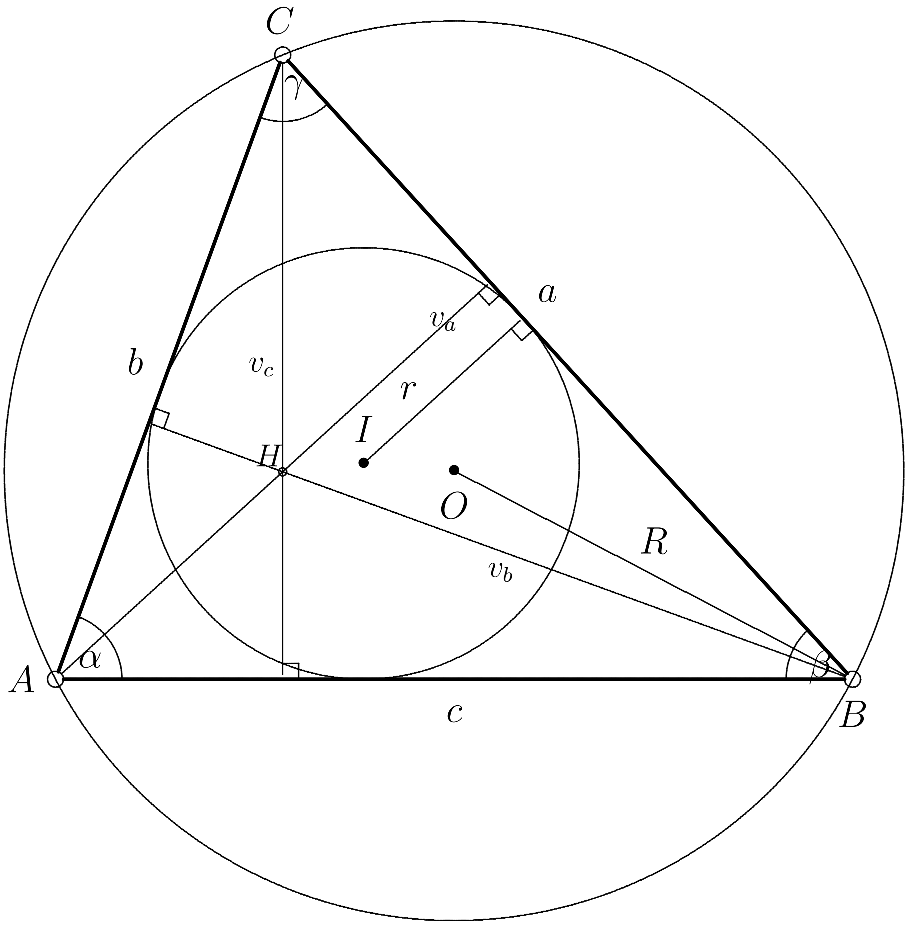
Trikotnik in krog



$\triangle ABC$:
$a, b, c \ldots$ stranice
$\alpha, \beta, \gamma \ldots$ notranji koti
$v_a, v_b, v_c \ldots$ višine
$o_{\triangle ABC} \ldots$ obseg
$S \ldots$ ploščina

$r \ldots$ polmer včrtanega kroga
$R \ldots$ polmer očrtanega kroga

$I \ldots$ središče včrtanega kroga
(presečišče simetral kotov)
$O \ldots$ središče očrtanega kroga
(presečišče simetral stranic)
$H \ldots$ višinska točka

$\alpha + \beta + \gamma = 180°$
$o_{\triangle ABC} = a + b + c$

Središčni kot je dvakrat
večji od obodnega:

$$\begin{cases} \measuredangle AOB = 2\gamma \\ \measuredangle AOC = 2\beta \\ \measuredangle BOC = 2\alpha \end{cases}$$

$$S_\triangle = \frac{av_a}{2} = \frac{bv_b}{2} = \frac{cv_c}{2} = \frac{1}{2}ab\sin\gamma = \frac{1}{2}ac\sin\beta = \frac{1}{2}bc\sin\alpha = \frac{abc}{4R} = s\cdot r$$

Heronov obrazec: $S_\triangle = \sqrt{s)(s-a)(a-b)(s-c)}, \quad s = \dfrac{a+b+c}{2}$

Sinusni izrek: $2R = \dfrac{a}{\sin\alpha} = \dfrac{b}{\sin\beta} = \dfrac{c}{\sin\gamma}$

Kosinusni izrek:

$$\begin{aligned} c^2 &= a^2 + b^2 - 2ab\cos\gamma \\ b^2 &= a^2 + c^2 - 2ac\cos\beta \\ a^2 &= b^2 + c^2 - 2bc\cos\alpha \end{aligned}$$

Tangensni izrek:

$$\begin{aligned} \frac{a+b}{a-b} &= \frac{\tan\frac{(\alpha+\beta)}{2}}{\tan\frac{(\alpha-\beta)}{2}} \\ \frac{b+c}{b-c} &= \frac{\tan\frac{(\beta+\gamma)}{2}}{\tan\frac{(\beta-\gamma)}{2}} \\ \frac{a+c}{a-c} &= \frac{\tan\frac{(\alpha+\gamma)}{2}}{\tan\frac{(\alpha-\gamma)}{2}} \end{aligned}$$