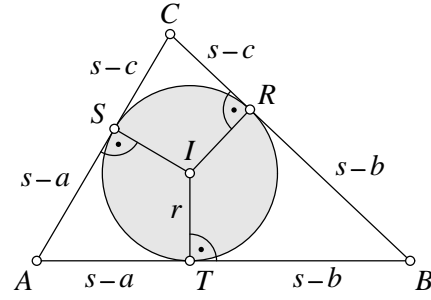
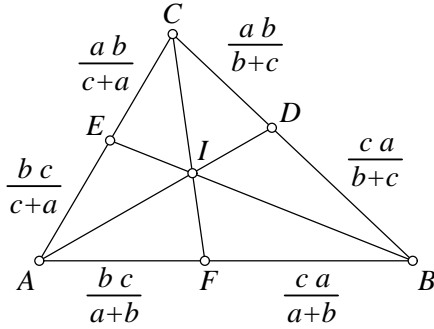


T.1.4 Formeln – Inkreismittelpunkt



$$\begin{aligned} \angle BAI = \angle CAI = \frac{\alpha}{2}, \quad \angle CBI = \angle ABI = \frac{\beta}{2}, \quad \angle ACI = \angle BCI = \frac{\gamma}{2}, \\ \angle BIC = 90^\circ + \frac{\alpha}{2}, \quad \angle CIA = 90^\circ + \frac{\beta}{2}, \quad \angle AIB = 90^\circ + \frac{\gamma}{2}, \\ \angle ADB = \gamma + \frac{\alpha}{2} = 90^\circ - \frac{\beta - \gamma}{2}, \quad \angle BEC = \alpha + \frac{\beta}{2} = 90^\circ - \frac{\gamma - \alpha}{2}, \\ \angle CFA = \beta + \frac{\gamma}{2} = 90^\circ - \frac{\alpha - \beta}{2}, \quad \angle CDA = \frac{\alpha}{2} + \beta = 90^\circ + \frac{\beta - \gamma}{2}, \\ \angle AEB = \frac{\beta}{2} + \gamma = 90^\circ + \frac{\gamma - \alpha}{2}, \quad \angle BFC = \frac{\gamma}{2} + \alpha = 90^\circ + \frac{\alpha - \beta}{2}, \\ \angle CIE = \angle BIF = 90^\circ - \frac{\alpha}{2} = \frac{\beta + \gamma}{2}, \quad \angle AIF = \angle CID = 90^\circ - \frac{\beta}{2} = \frac{\gamma + \alpha}{2}, \\ \angle BID = \angle AIE = 90^\circ - \frac{\gamma}{2} = \frac{\alpha + \beta}{2}, \end{aligned}$$

$$w_a = AD = \sqrt{bc \left[1 - \frac{a^2}{(b+c)^2} \right]} = \frac{2bc}{b+c} \cos \frac{\alpha}{2} = \frac{2rs}{(b+c) \sin \frac{\alpha}{2}} = \frac{2\sqrt{bc}}{b+c} \sqrt{s(s-a)},$$

$$w_b = BE = \sqrt{ca \left[1 - \frac{b^2}{(c+a)^2} \right]} = \frac{2ca}{c+a} \cos \frac{\beta}{2} = \frac{2rs}{(c+a) \sin \frac{\beta}{2}} = \frac{2\sqrt{ca}}{c+a} \sqrt{s(s-b)},$$

$$w_c = CF = \sqrt{ab \left[1 - \frac{c^2}{(a+b)^2} \right]} = \frac{2ab}{a+b} \cos \frac{\gamma}{2} = \frac{2rs}{(a+b) \sin \frac{\gamma}{2}} = \frac{2\sqrt{ab}}{a+b} \sqrt{s(s-c)},$$

$$AF = \frac{bc}{a+b}, \quad BD = \frac{ca}{b+c}, \quad CE = \frac{ab}{c+a},$$

$$FB = \frac{ca}{a+b}, \quad DC = \frac{ab}{b+c}, \quad EA = \frac{bc}{c+a},$$

$$AF + BD + CE = \frac{(bc + ca + ab)^2 + bc^3 + ca^3 + ab^3}{(b+c)(c+a)(a+b)},$$

$$FB + DC + EA = \frac{(bc + ca + ab)^2 + b^3c + c^3a + a^3b}{(b+c)(c+a)(a+b)},$$