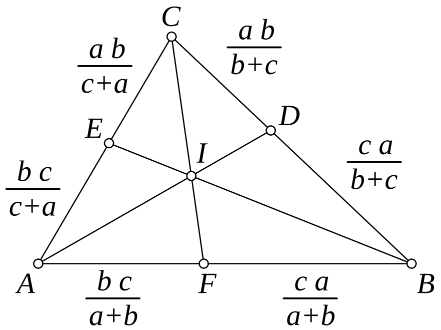
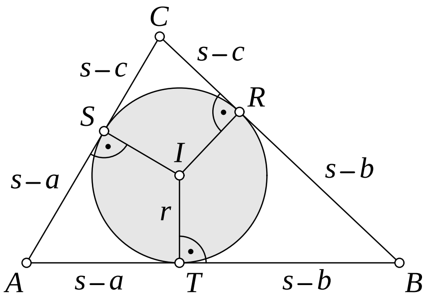
T.1.4 Formeln – Inkreismittelpunkt





$$\measuredangle BAI = \measuredangle CAI = \frac{\alpha}{2}, \qquad \measuredangle CBI = \measuredangle ABI = \frac{\beta}{2}, \qquad \measuredangle ACI = \measuredangle BCI = \frac{\gamma}{2},$$

$$\measuredangle BIC = 90^\circ + \frac{\alpha}{2}, \qquad \measuredangle CIA = 90^\circ + \frac{\beta}{2}, \qquad \measuredangle AIB = 90^\circ + \frac{\gamma}{2},$$

$$\measuredangle ADB = \gamma + \frac{\alpha}{2} = 90^\circ - \frac{\beta-\gamma}{2}, \qquad \measuredangle BEC = \alpha + \frac{\beta}{2} = 90^\circ - \frac{\gamma-\alpha}{2},$$

$$\measuredangle CFA = \beta + \frac{\gamma}{2} = 90^\circ - \frac{\alpha-\beta}{2}, \qquad \measuredangle CDA = \frac{\alpha}{2} + \beta = 90^\circ + \frac{\beta-\gamma}{2},$$

$$\measuredangle AEB = \frac{\beta}{2} + \gamma = 90^\circ + \frac{\gamma-\alpha}{2}, \qquad \measuredangle BFC = \frac{\gamma}{2} + \alpha = 90^\circ + \frac{\alpha-\beta}{2},$$

$$\measuredangle CIE = \measuredangle BIF = 90^\circ - \frac{\alpha}{2} = \frac{\beta+\gamma}{2}, \qquad \measuredangle AIF = \measuredangle CID = 90^\circ - \frac{\beta}{2} = \frac{\gamma+\alpha}{2},$$

$$\measuredangle BID = \measuredangle AIE = 90^\circ - \frac{\gamma}{2} = \frac{\alpha+\beta}{2},$$

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

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

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

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

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

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

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