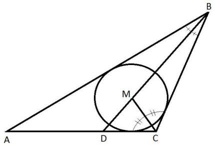

$\sphericalangle\triangle ABC: \frac{AD}{DC} = \frac{BA}{BC} = \frac{c}{a} \quad \Rightarrow \quad \boldsymbol{r}_D = \frac{\boldsymbol{r}_A + \frac{c}{a}\boldsymbol{r}_C}{1+\frac{c}{a}}.$

$$\frac{AD+DC}{DC} = \frac{c}{a} + 1 \quad \Rightarrow \quad \frac{AC}{DC} = \frac{c}{a} + 1 \quad \Rightarrow \quad DC = \frac{AC}{\frac{c}{a}+1}.$$

$\sphericalangle\triangle BCD: \frac{BM}{MD} = \frac{BC}{CD} = \frac{a}{b}(\frac{c}{a}+1),$

$$\boldsymbol{r}_M = \frac{\boldsymbol{r}_B + \frac{a}{b}(\frac{c}{a}+1)\boldsymbol{r}_D}{1+\frac{a}{b}(\frac{c}{a}+1)} = \frac{\boldsymbol{r}_B + \frac{a}{b}(\frac{c}{a}+1)\frac{\boldsymbol{r}_A+\frac{c}{a}\boldsymbol{r}_C}{1+\frac{c}{a}}}{1+\frac{a}{b}(\frac{c}{a}+1)} = \frac{a\boldsymbol{r}_A + b\boldsymbol{r}_B + c\boldsymbol{r}_C}{a+b+c}.$$

$\sphericalangle\triangle AMC:$

Пусть $d = AM = |\boldsymbol{r}_M - \boldsymbol{r}_A|$, $e = MC = |\boldsymbol{r}_C - \boldsymbol{r}_M|$, тогда

$$S_{\triangle AMC} = \sqrt{p(p-d)(p-e)(p-b)} = \frac{1}{2}bR,$$

где $p = \frac{d+e+b}{2}$ – полупериметр треугольника $\triangle AMC$, R – его высота (радиус вписанной окружности).

$$R = \frac{2\sqrt{p(p-d)(p-e)(p-b)}}{b}.$$