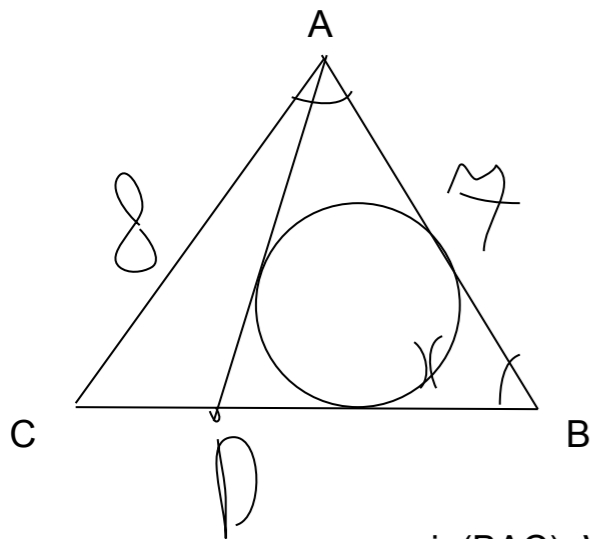


В тр ABC известны стороны AB=7, AC=8 и $\cos(\text{BAC})=11/16$. На стороне BC выбраны точка D так, что $DC/BC=1/3$ Найти радиус окр-ти, вписанной в трABD



$$\begin{aligned} BC^2 &= 49 + 64 - 2 \cdot 8 \cdot 7 \cdot \cos(\text{BAC}) \\ &= 113 - 112 \cdot 11/16 = 113 - 77 = 36 \\ BC &= 6 \\ BD &= \frac{2}{3} \cdot 6 = 4 \end{aligned}$$

$$\sin(\text{BAC}) = \sqrt{1 - \cos^2(\text{BAC})} = \sqrt{1 - 121/256} = \sqrt{135/256} = 1/16 \cdot \sqrt{135}$$

$$6/\sin \text{BAC} = 8/\sin x \Rightarrow \sin x = 4/3 \cdot \sin \text{BAC} \Rightarrow \sin x = 1/12 \cdot \sqrt{135}$$

$$\cos x = \sqrt{1 - \sin^2 x} = \sqrt{1 - 135/144} = \sqrt{9/144} = 3/12 = 1/4$$

$$AD^2 = 49 + 16 - 2 \cdot 7 \cdot 4 \cdot \cos x \quad AD^2 = 65 - 56 \cdot 1/4 = 65 - 14 = 51 \quad AD = \sqrt{51}$$

$$2R = \sqrt{51}/\sin x = \sqrt{51}/(1/12 \cdot \sqrt{135}) = 12 \cdot \sqrt{51/135} = 12 \cdot \sqrt{17/45}$$

$$R = 6 \cdot \sqrt{17/45}$$

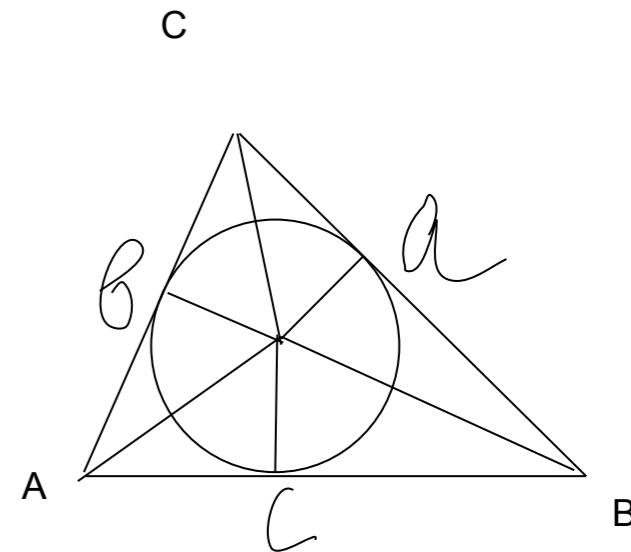
$$S(\text{ABD}) = 1/2 \cdot 7 \cdot 4 \cdot \sin x = 14 \cdot 1/12 \cdot \sqrt{135} = 7/6 \cdot \sqrt{135}$$

$$r = 2 \cdot S(\text{ABD}) / (7 + 4 + \sqrt{51}) = (7/3 \cdot \sqrt{135}) / (11 + \sqrt{51}) = 7\sqrt{15} / (11 + \sqrt{51}) = 7\sqrt{15} \cdot (11 - \sqrt{51}) / 70$$

$$r = \sqrt{15} \cdot (11 - \sqrt{51}) / 10$$

$$r = (11\sqrt{15} - 3\sqrt{85}) / 10$$

Ответ: $(11\sqrt{15} - 3\sqrt{85}) / 10$



$$S(\text{ABC}) = 1/2 \cdot ar + 1/2 \cdot br + 1/2 \cdot cr = 1/2 \cdot r(a + b + c)$$

$$r = 2 \cdot S(\text{ABC}) / (a + b + c)$$