17.9 Commençons par résoudre ce triangle :

$c^2 = a^2 + b^2 - 2\,a\,b\,\cos(\gamma) = 28,4^2 + 36,9^2 - 2 \cdot 28,4 \cdot 36,9 \cdot \cos(54,9^\circ) \approx 963,00$

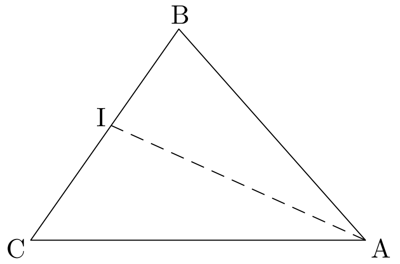
$c \approx \sqrt{963,00} = 31,03$

$\cos(\alpha) = \frac{a^2-b^2-c^2}{-2\,b\,c} \approx \frac{28,4^2-36,9^2-31,03^2}{-2 \cdot 36,9 \cdot 31,03} = 0,662852$

$\alpha \approx \arccos(0,662852) = 48,48^\circ$

$\beta = 180^\circ - (\alpha + \gamma) \approx 180^\circ - (48,48^\circ + 54,9^\circ) = 76,62^\circ$

Calcul de la bissectrice b_a

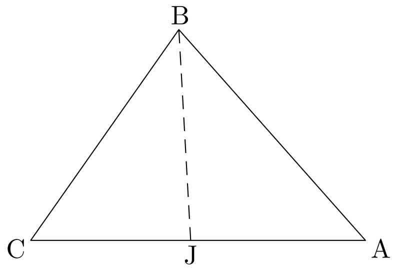


$\widehat{\text{AIB}} = 180^\circ - (\frac{1}{2}\,\alpha + \beta) \approx 180^\circ - (\frac{1}{2} \cdot 48,48^\circ + 76,62^\circ) = 79,14^\circ$

En considérant le triangle ABI, on pose $\dfrac{b_a}{\sin(\beta)} = \dfrac{c}{\sin(\widehat{\text{AIB}})}$, d'où l'on tire

$$b_a = \frac{c\,\sin(\beta)}{\sin(\widehat{\text{AIB}})} \approx \frac{31,03 \cdot \sin(76,62^\circ)}{\sin(79,14^\circ)} = 30,74$$

Calcul de la bissectrice b_b

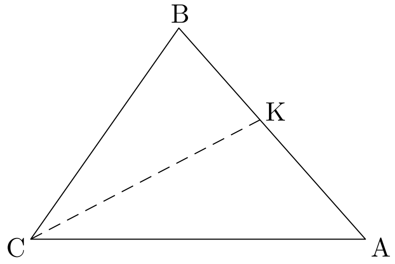


$\widehat{\text{AJB}} = 180^\circ - (\alpha + \frac{1}{2}\,\beta) \approx 180^\circ - (48,48^\circ + \frac{1}{2} \cdot 76,62^\circ) = 93,21^\circ$

En appliquant le théorème du sinus au triangle ABJ, on obtient :

$$b_b = \frac{c\,\sin(\alpha)}{\sin(\widehat{\text{AJB}})} \approx \frac{31,03 \cdot \sin(48,48^\circ)}{\sin(93,21^\circ)} = 23,27$$

Calcul de la bissectrice b_c



$\widehat{\mathrm{CKA}} = 180^\circ - (\alpha + \frac{1}{2}\,\gamma) \approx 180^\circ - (48,48^\circ + \frac{1}{2} \cdot 54,9^\circ) = 104,07^\circ$

On utilise le théorème du sinus pour le triangle AKC pour avoir :

$b_c = \dfrac{b\,\sin(\alpha)}{\sin(\widehat{\mathrm{CKA}})} \approx \dfrac{36,9 \cdot \sin(48,48^\circ)}{\sin(104,07^\circ)} = 28,48$