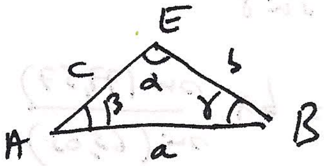
Triangle AEB on a : $a = 103{,}56$ m $\beta = 63{,}03$ g et $\gamma = 77{,}57$ g (1)



$\alpha + \beta + \gamma = 200$ g , donc $\alpha = 200 - 63{,}03 - 77{,}57$

$\alpha = 59{,}13$ g

$$\frac{1}{2}\, a c \sin\beta = \frac{1}{2}\, a b \sin\gamma \iff c = \frac{b \times \sin\gamma}{\sin\alpha}$$

Donc $c = b \times \dfrac{\sin(77{,}57)}{\sin(63{,}03)} = 1{,}1226\, b$

D'autre part, on sait que $a^2 = b^2 + c^2 - 2bc\cos\alpha$

Donc $a^2 = b^2 + (1{,}1226\, b)^2 - 2 \times b \times (1{,}1226\, b) \times \cos(59{,}13)$

Donc $a^2 = b^2\left(1 + (1{,}1226)^2 - 2 \times 1{,}1226 \times \cos(59{,}13)\right)$

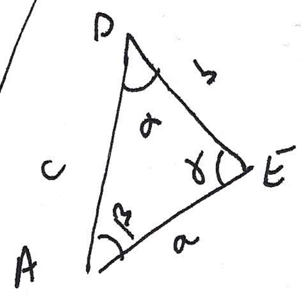
Donc $a^2 = b^2 \times (0{,}9158)$ Donc $b = \dfrac{a}{\sqrt{0{,}9158}} = 108{,}22$ m

et donc $c = 1{,}1226 \times 108{,}22 = 121{,}48$.

Donc

AE = 121,48 m	AB = 103,56 m	EB = 108,22 m
$\widehat{AEB} = 59{,}13$ g	$\widehat{EBA} = 77{,}57$ g	$\widehat{BAE} = 63{,}03$ g.

Triangle ADE



on a : $a = 121{,}48$ m $b = 112{,}99$ m $c = 217{,}34$ m.

Il faut trouver α, β et γ

On utilise les relations d'Al Kashi

$$\begin{cases} a^2 = b^2 + c^2 - 2bc\cos\alpha \\ b^2 = a^2 + c^2 - 2ac\cos\beta \\ c^2 = a^2 + b^2 - 2ab\cos\gamma \end{cases} \iff$$

$$\cos\alpha = \frac{b^2 + c^2 - a^2}{2bc} = \frac{(112{,}99)^2 + (217{,}34)^2 - (121{,}48)^2}{2 \times 112{,}99 \times 217{,}34} = 0{,}9212$$

Donc $\alpha = 25{,}48$ g

$$\cos\beta = \frac{a^2 + c^2 - b^2}{2ac} = \frac{(121{,}48)^2 + (217{,}34)^2 - (112{,}99)^2}{2 \times 121{,}48 \times 217{,}34} = 0{,}9326$$

Donc $\beta = 23{,}60$ g