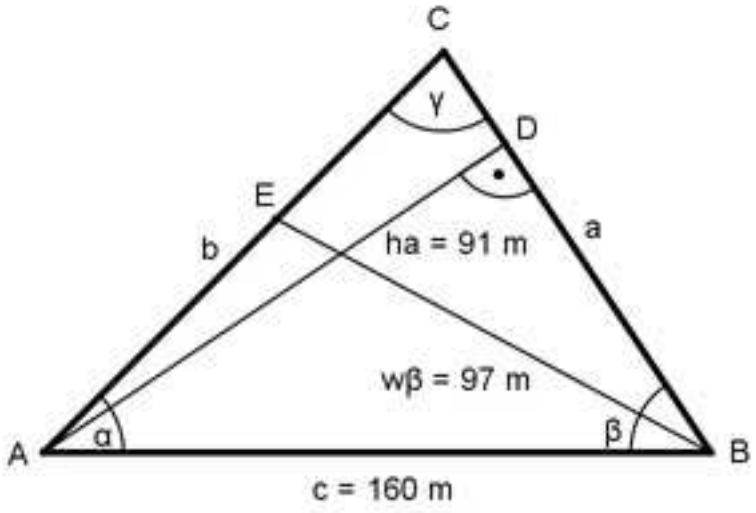
Trigonometrie Aufgabe 147

Berechnen Sie die Seite b, wenn c = 160 m, ha = 91 m und die Winkelhalbierende wβ = 97 m.



Im Dreieck ABD:

$$\sin \beta = \frac{h_a}{c} = \frac{91\ m}{160\ m} = 0{,}5688 \dashrightarrow \beta = 34{,}7°$$

Im Dreieck ABE:

Fall SWS:

Cosinussatz:

$AE^2 = c^2 + w_\beta^2 - 2 * c * w_\beta * \cos \beta/2$

$AE^2 = 160^2\ m^2 + 97^2\ m^2 - 2 * 160\ m * 97\ m * \cos (34{,}7/2)°$

$AE^2 = 160^2\ m^2 + 97^2\ m^2 - 2 * 160\ m * 97\ m * 0{,}9545$

$AE^2 = 5\ 381{,}3\ |\sqrt{}$

$AE = 73{,}4\ m$

Fall SSW:

Sinussatz:

$$\frac{w_\beta}{} = \frac{AE}{} \mid *\sin \alpha$$

$$\frac{\sin \alpha}{} \qquad \frac{\sin \beta/2}{}$$

$$w_\beta = \frac{AE * \sin \alpha}{\sin \beta/2} \mid * \sin \beta/2$$

$$w_\beta * \sin \beta/2 = AE * \sin \alpha \mid :AE$$

$$\sin \alpha = \frac{w_\beta * \sin \beta/2}{AE} = \frac{97\ m * \sin (34{,}7/2)°}{73{,}4\ m} = \frac{97\ m * 0{,}2982}{73{,}4\ m} =$$

$\sin \alpha = 0{,}3941 \dashrightarrow \alpha = 23{,}2°$

$\gamma = 180° - \alpha - \beta = 180° - 23{,}2° - 34{,}7° = 122{,}1°$

Im Dreieck ABC:

Fall SSW:

$$\frac{b}{\sin \beta} = \frac{c}{\sin \gamma} \mid *\sin \beta$$

$$\mathbf{b =} \frac{c * \sin \beta}{\sin \gamma} = \frac{160\ m * \sin 34{,}7°}{\sin 122{,}1°} = \frac{160\ m * 0{,}5693}{0{,}8471} = \mathbf{107{,}5\ m}$$