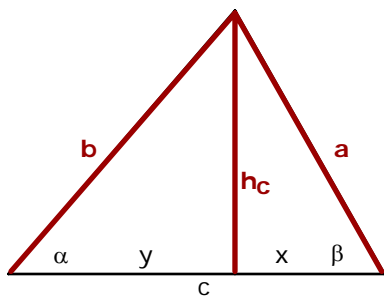


Von einem nicht rechtwinkligen Dreieck sind die fehlenden Seiten und Winkel zu berechnen:

- a) $a = 4.38$, $b = 6.15$, $h_c = 3.71$ (das Dreieck ist spitzwinklig)
 b) $a = 0.62$, $b = 0.83$, $h_b = 0.38$ ($\gamma < 90^\circ$)
 c) $h_a = 4.2$, $\beta = 37^\circ$, $\gamma = 46^\circ$
 d) $a = 6.2$, $c = 5.6$, $\beta = 35^\circ$

Alle Resultate sind gerundet. Ich habe aber für weitere Rechnungen die exakten Werte benutzt, was kleine Abweichungen im Resultat erklären mag.

- a) $a = 4.38$, $b = 6.15$, $h_c = 3.71$



$$\sin \beta = \frac{h_c}{a} \Rightarrow \beta = 57.89^\circ$$

$$\tan \beta = \frac{h_c}{x} \Rightarrow x = \frac{h_c}{\tan \beta} = 2.33$$

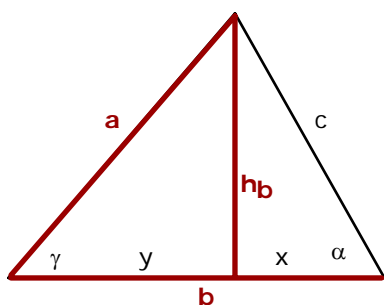
$$\sin \alpha = \frac{h_c}{b} \Rightarrow \alpha = 37.10^\circ$$

$$\tan \alpha = \frac{h_c}{y} \Rightarrow y = \frac{h_c}{\tan \alpha} = 4.90$$

$$c = x + y = 7.23$$

$$\gamma = 180^\circ - \alpha - \beta = 85.01^\circ$$

- b) $a = 0.62$, $b = 0.83$, $h_b = 0.38$



$$\sin \gamma = \frac{h_b}{a} \Rightarrow \gamma = 37.80^\circ$$

$$\tan \gamma = \frac{h_b}{y} \Rightarrow y = \frac{h_b}{\tan \gamma} = 0.49$$

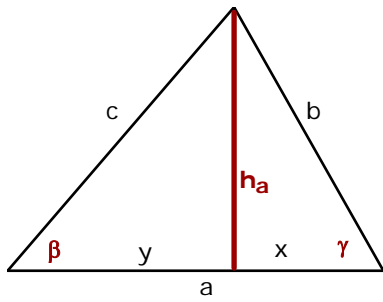
$$x = b - y = 0.34$$

$$\tan \alpha = \frac{h_b}{x} \Rightarrow \alpha = 48.17^\circ$$

$$\sin \alpha = \frac{h_b}{c} \Rightarrow c = \frac{h_b}{\sin \alpha} = 0.51$$

$$\beta = 180^\circ - \alpha - \gamma = 94.03^\circ$$

c) $h_a = 4.2, \quad \beta = 37^\circ, \quad \gamma = 46^\circ$



$$\alpha = 180^\circ - \beta - \gamma = 97^\circ$$

$$\sin \beta = \frac{h_a}{c} \Rightarrow c = \frac{h_a}{\sin \beta} = 6.97$$

$$\sin \gamma = \frac{h_a}{b} \Rightarrow b = \frac{h_a}{\sin \gamma} = 5.84$$

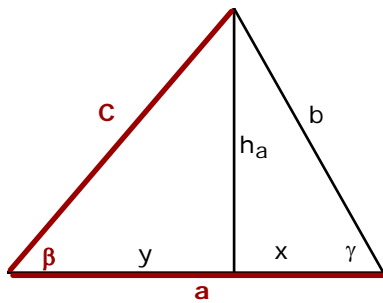
$$\tan \beta = \frac{h_a}{y} \Rightarrow y = \frac{h_a}{\tan \beta} = 5.57$$

$$\tan \gamma = \frac{h_a}{x} \Rightarrow x = \frac{h_a}{\tan \gamma} = 4.06$$

$$a = x + y = 9.63$$

Beim folgenden Beispiel könnte man auch h_c als Hilfslinie einzeichnen.

d) $a = 6.2, \quad c = 5.6, \quad \beta = 35^\circ$



$$\sin \beta = \frac{h_a}{c} \Rightarrow h_a = c \cdot \sin \beta = 3.21$$

$$\cos \beta = \frac{y}{c} \Rightarrow y = c \cdot \cos \beta = 4.59$$

$$x = a - y$$

$$\tan \gamma = \frac{h_a}{x} \Rightarrow \gamma = 63.34^\circ$$

$$\alpha = 180^\circ - \beta - \gamma = 81.66^\circ$$

$$\sin \gamma = \frac{h_a}{b} \Rightarrow b = \frac{h_a}{\sin \gamma} = 3.59$$