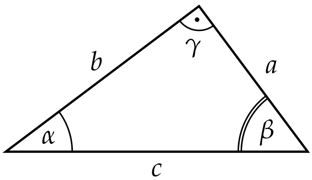


Aufgabe 9

a)

$$c = 12{,}5\ cm \qquad \alpha = 37{,}56^\circ$$

Mit

$$\alpha + \beta + \gamma = 180^\circ$$

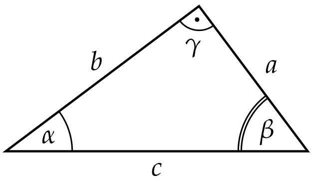
erhalten wir

$$\begin{aligned} 37{,}56^\circ + \beta + 90^\circ &= 180^\circ \\ 127{,}56^\circ + \beta &= 180^\circ && \mid -127{,}56^\circ \\ \beta &= 52{,}44^\circ \end{aligned}$$

Weiter folgt

$$\begin{aligned} \sin(37{,}56^\circ) &= \frac{a}{12{,}5} && \mid \cdot 12{,}5 \\ a &= 12{,}5 \cdot \sin(37{,}56^\circ) \\ a &\approx 7{,}62\ [cm] \end{aligned}$$

$$\begin{aligned} \cos(37{,}56^\circ) &= \frac{b}{12{,}5} && \mid \cdot 12{,}5 \\ b &= 12{,}5 \cdot \cos(37{,}56^\circ) \\ b &\approx 9{,}91\ [cm] \end{aligned}$$



b)

$$a = 5{,}4\ cm \qquad b = 3{,}9\ cm$$

Zunächst bestimmen wir den Winkel α:

$$\begin{aligned} \tan(\alpha) &= \frac{5{,}4}{3{,}9} \\ \tan(\alpha) &= 1{,}38 && \mid \tan^{-1} \\ \alpha &= 54{,}07^\circ \end{aligned}$$

Mit

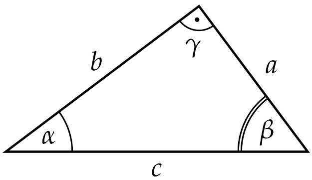
$$\alpha + \beta + \gamma = 180^\circ$$

folgt

$$\begin{aligned} 54{,}07^\circ + \beta + 90^\circ &= 180^\circ \\ 144{,}07^\circ + \beta &= 180^\circ && \mid -144{,}07^\circ \\ \beta &= 35{,}93^\circ \end{aligned}$$

Und anschließend

$$\begin{aligned} \sin(54{,}07^\circ) &= \frac{5{,}4}{c} && \mid \cdot c \\ c \cdot \sin(54{,}07^\circ) &= 5{,}4 && \mid : \sin(54{,}07^\circ) \\ c &= \frac{5{,}4}{\sin(54{,}07^\circ)} \\ c &\approx 6{,}67\ [cm] \end{aligned}$$



c)

$$b = 6{,}5\ cm \qquad \beta = 54{,}2^\circ$$

Mit

$$\alpha + \beta + \gamma = 180^\circ$$

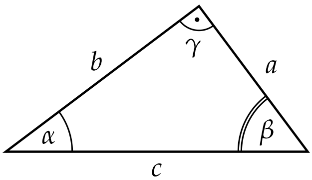
erhalten wir

$$\begin{aligned} \alpha + 54{,}2^\circ + 90^\circ &= 180^\circ \\ \alpha + 144{,}2^\circ &= 180^\circ && \mid -144{,}2^\circ \\ \alpha &= 35{,}8^\circ \end{aligned}$$

Weiter folgt

$$\begin{aligned} \sin(54{,}2^\circ) &= \frac{6{,}5}{c} && \mid \cdot c \\ c \cdot \sin(54{,}2^\circ) &= 6{,}5 && \mid : \sin(54{,}2^\circ) \\ c &= \frac{6{,}5}{\sin(54{,}2^\circ)} \\ c &= 8{,}01\ [cm] \end{aligned}$$

$$\begin{aligned} \cos(54{,}2^\circ) &= \frac{a}{8{,}01} && \mid \cdot 8{,}01 \\ a &= 8{,}01 \cdot \cos(54{,}2^\circ) \\ a &= 4{,}69\ [cm] \end{aligned}$$



d)

$$b = 3{,}5\ cm \qquad c = 9{,}4\ cm$$

Zunächst bestimmen wir den Winkel β:

$$\begin{aligned} \sin(\beta) &= \frac{3{,}5}{9{,}4} \\ \sin(\beta) &= 0{,}37 && \mid \sin^{-1} \\ \beta &= 21{,}72^\circ \end{aligned}$$

Mit

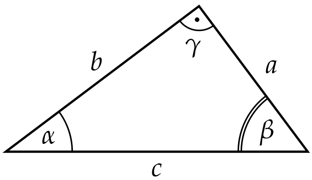
$$\alpha + \beta + \gamma = 180^\circ$$

folgt

$$\begin{aligned} \alpha + 21{,}72^\circ + 90^\circ &= 180^\circ \\ \alpha + 111{,}72^\circ &= 180^\circ && \mid -111{,}72^\circ \\ \alpha &= 68{,}28^\circ \end{aligned}$$

Und anschließend

$$\begin{aligned} \sin(68{,}28^\circ) &= \frac{a}{9{,}4} && \mid \cdot 9{,}4 \\ a &= 9{,}4 \cdot \sin(68{,}28^\circ) \\ a &\approx 8{,}73\ [cm] \end{aligned}$$



e)

$$c = 10{,}2\ cm \qquad \beta = 40^\circ$$

Mit

$$\alpha + \beta + \gamma = 180^\circ$$

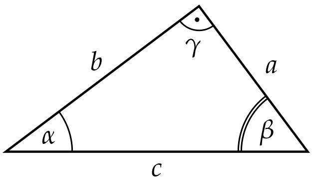
erhalten wir

$$\begin{aligned} \alpha + 40^\circ + 90^\circ &= 180^\circ \\ \alpha + 130^\circ &= 180^\circ && \mid -130^\circ \\ \alpha &= 50^\circ \end{aligned}$$

Weiter folgt

$$\begin{aligned} \sin(50^\circ) &= \frac{a}{10{,}2} && \mid \cdot 10{,}2 \\ a &= 10{,}2 \cdot \sin(50^\circ) \\ a &\approx 7{,}81\ [cm] \end{aligned}$$

$$\begin{aligned} \cos(50^\circ) &= \frac{b}{10{,}2} && \mid \cdot 10{,}2 \\ b &= 10{,}2 \cdot \cos(50^\circ) \\ b &\approx 6{,}56\ [cm] \end{aligned}$$



f)

$$c = 10\ cm \qquad a = 6\ cm$$

Zunächst bestimmen wir den Winkel α:

$$\begin{aligned}
\sin(\alpha) &= \frac{6}{10} \\
\sin(\alpha) &= 0{,}6 && |\sin^{-1} \\
\alpha &= 36{,}87^\circ
\end{aligned}$$

Mit

$$\alpha + \beta + \gamma = 180^\circ$$

folgt

$$\begin{aligned}
36{,}87^\circ + \beta + 90^\circ &= 180^\circ \\
\beta + 126{,}87^\circ &= 180^\circ && |-126{,}87^\circ \\
\beta &= 53{,}13^\circ
\end{aligned}$$

Und anschließend

$$\begin{aligned}
\sin(53{,}13^\circ) &= \frac{b}{10} && |\cdot 10 \\
b &= 10 \cdot \sin(53{,}13^\circ) \\
b &\approx 8\ [cm]
\end{aligned}$$