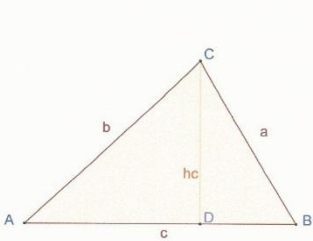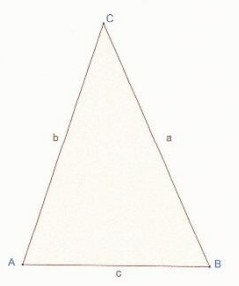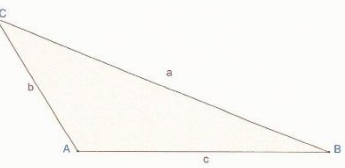# Trigonometrie – Berechnungen in schiefwinkeligen Dreiecken

Lösungsblatt 1

Berechnen Sie in folgenden Beispielen die gesuchten Größen!

Sinussatz für die Berechnung der Winkel und der Seite b!

h_c aus dem ▲ ADC

▲ ABC: a = 42 mm, c = 60 mm, α = 43°; gesucht: γ, β, b, h_c und A!

$\dfrac{a}{\sin \alpha} = \dfrac{c}{\sin \gamma}$

a . sin γ = c . sin α

$\sin \gamma = \dfrac{c . \sin \alpha}{a}$

$\sin \gamma = \dfrac{60 . \sin 43°}{42}$

$\sin \gamma = \dfrac{60 . 0{,}68…}{42}$

$\sin \gamma = 0{,}97…$

  γ = 76,97°

β = 180° - 43° - 76,97°

  β = 60,02°

$\dfrac{a}{\sin \alpha} = \dfrac{b}{\sin \beta}$

$b = \dfrac{a . \sin \beta}{\sin \alpha}$

$b = \dfrac{42 . \sin 60{,}02°}{\sin 43°}$

$b = \dfrac{42 . 0{,}86…}{0{,}68…}$

b = 53,34 mm

$A = \dfrac{1}{2} . a . c . \sin \beta$

$A = \dfrac{1}{2} . 42 . 60 . \sin 60{,}02°$

$A = \dfrac{1}{2} . 42 . 60 . 0{,}86…$

A = 1091,41 mm²

A = 10,9141 cm²

$h_c = b . \sin \alpha$

$h_c = 53{,}34 . \sin 43°$

$h_c = 53{,}34 . 0{,}68...$

$h_c = 36{,}37$ mm

Sinussatz!

▲ ABC: b = 77 m, β = 65°, γ = 42°; gesucht: α, a, c und A!

α = 180° - 65° - 42°

  α = 73°

$\dfrac{a}{\sin \alpha} = \dfrac{b}{\sin \beta}$

$a = \dfrac{b . \sin \alpha}{\sin \beta}$

$a = \dfrac{77 . \sin 73°}{\sin 65°}$

$a = \dfrac{77 . 0{,}95…}{0{,}09…}$

a = 81,24 m

$\dfrac{b}{\sin \beta} = \dfrac{c}{\sin \gamma}$

$c = \dfrac{b . \sin \gamma}{\sin \beta}$

$c = \dfrac{77 . \sin 42°}{\sin 65°}$

$c = \dfrac{77 . 0{,}66…}{0{,}90…}$

c = 56,84 m

$A = \dfrac{1}{2} . b . c . \sin \alpha$

$A = \dfrac{1}{2} . 77 . 56{,}84 . \sin 73°$

$A = \dfrac{1}{2} . 77 . 56{,}84 . 0{,}95…$

A = 4185,43 m²

A = 41 a 85,43 m²

Sinussatz!

▲ ABC: a = 105 m, b = 47 m, α = 117°; gesucht: β, γ, c und A!

$\dfrac{a}{\sin \alpha} = \dfrac{b}{\sin \beta}$

$\sin \beta = \dfrac{b . \sin \alpha}{a}$

$\sin \beta = \dfrac{47 . \sin 117°}{105}$

$\sin \beta = \dfrac{47 . 0{,}89…}{105}$

$\sin \beta = 0{,}39…$

  β = 23,5°

γ = 180° - 117° - 23,5°

  γ = 39,49°

$\dfrac{a}{\sin \alpha} = \dfrac{c}{\sin \gamma}$

$c = \dfrac{a . \sin \gamma}{\sin \alpha}$

$c = \dfrac{105 . \sin 39{,}49°}{\sin 117°}$

$c = \dfrac{105 . 0{,}63…}{0{,}89…}$

c = 74,94 m

$A = \dfrac{1}{2} . a . b . \sin \gamma$

$A = \dfrac{1}{2} . 105 . 47 . \sin 39{,}49°$

$A = \dfrac{1}{2} . 105 . 47 . 0{,}63…$

A = 1569,19 m²

A = 15 a 69,19 m²