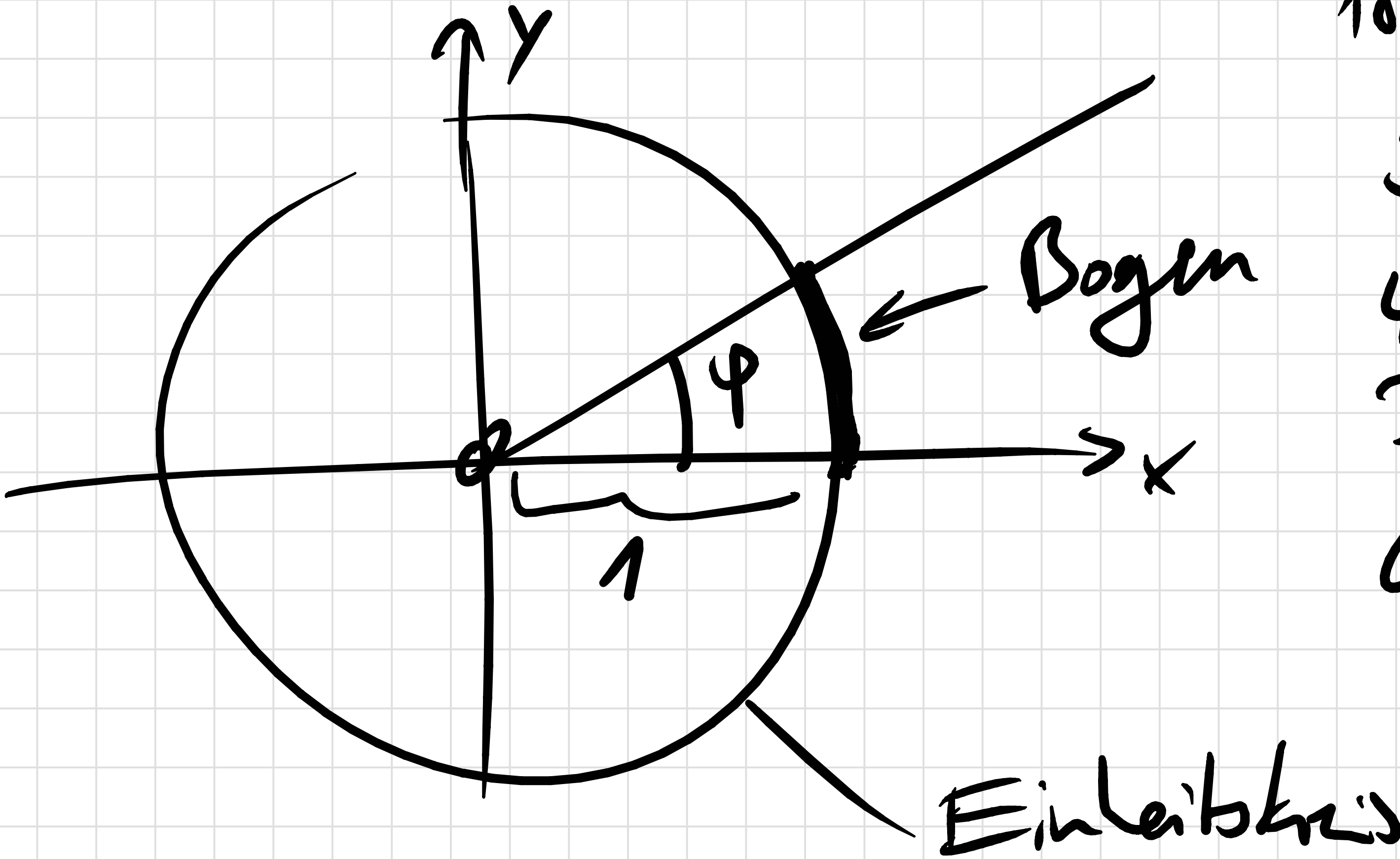
Bogenmaß

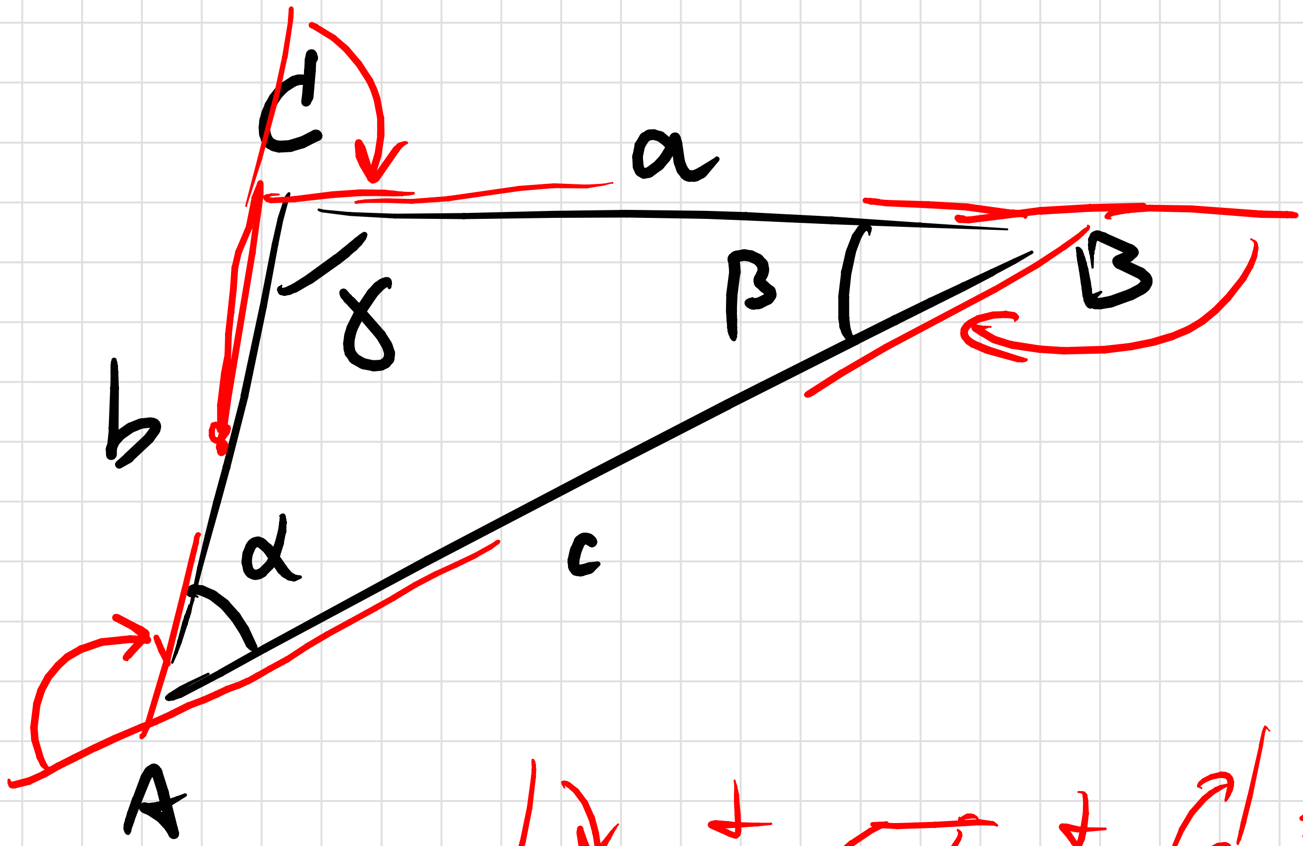


°	rad
360°	2π
180°	π
90°	$\pi/2$
45°	$\pi/4$
30°	$\pi/6$
60°	$\pi/3$
0°	0

Winkel im Bogenmaß

$$= \frac{\pi}{180^\circ} \cdot \text{Winkel in Grad}$$

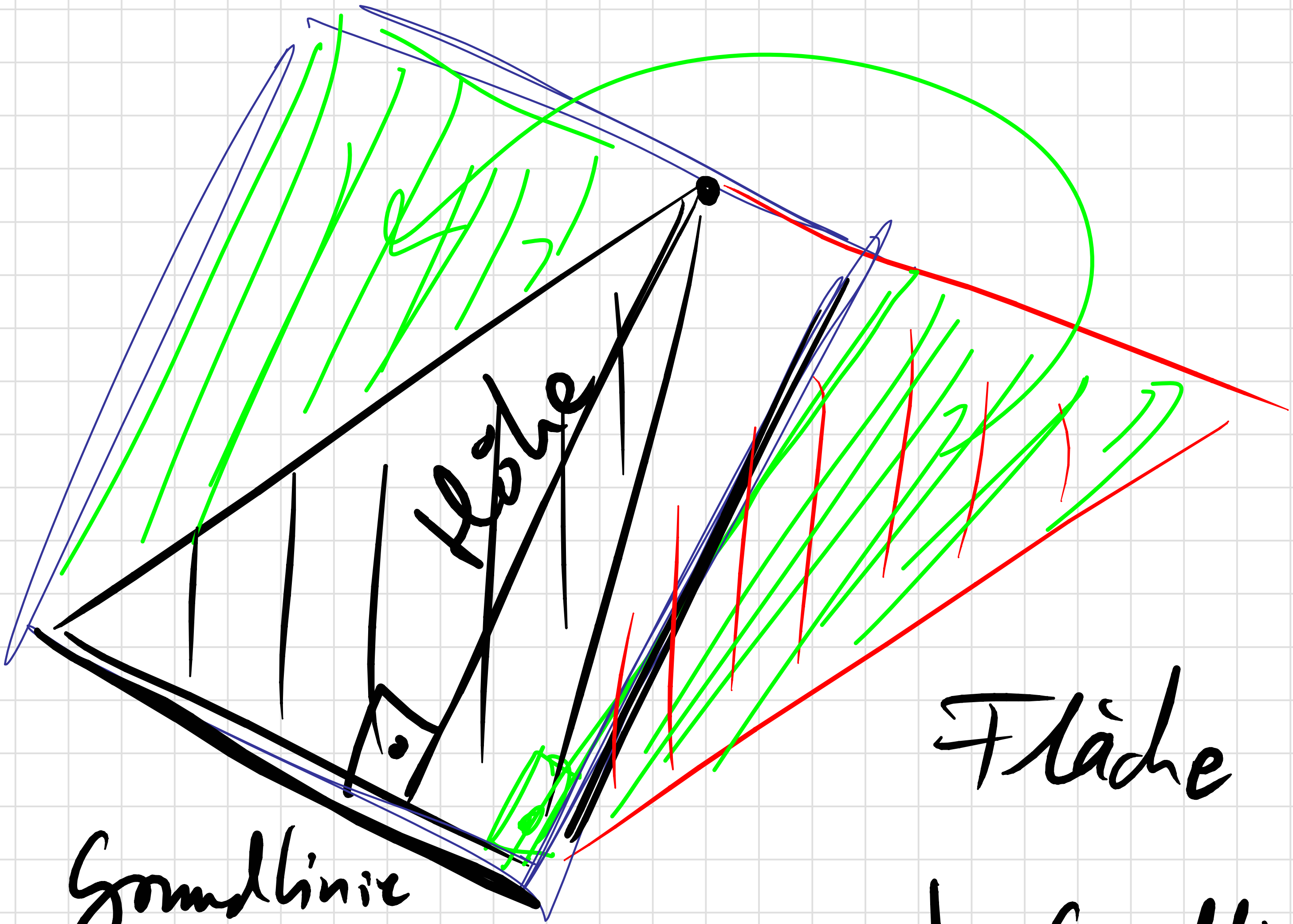
	Winkelgrad (°)	Rad	Gon
	360°	2π	400 gon
rechter Winkel	90°	$\pi/2$	100 gon



$$\underbrace{(180^\circ-\gamma) + (180^\circ-\beta) + (180^\circ-\alpha)} = 360^\circ$$

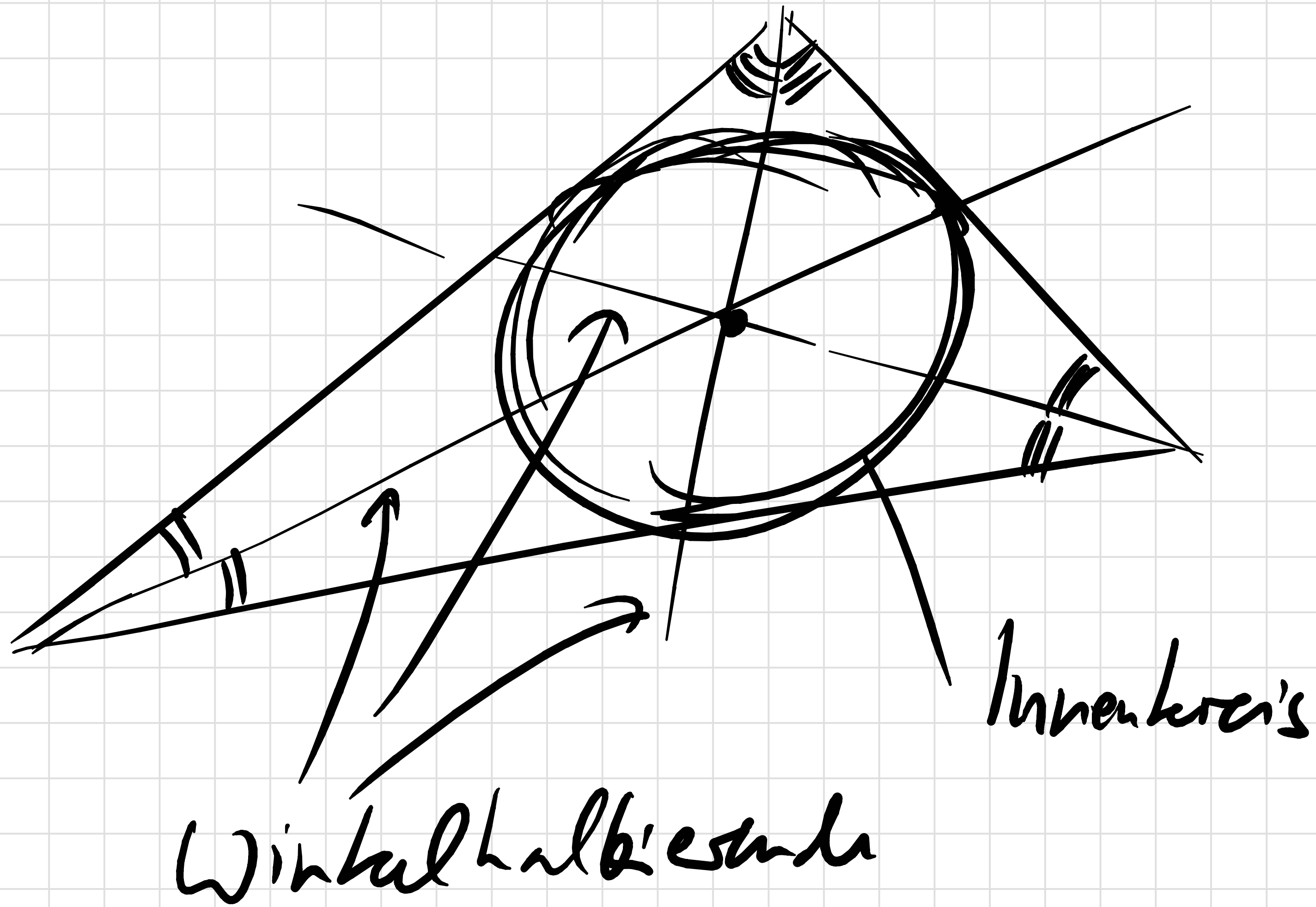
$$\cancel{360^\circ} + \underbrace{180^\circ - \alpha - \beta - \gamma}_{0} = \cancel{360^\circ}$$

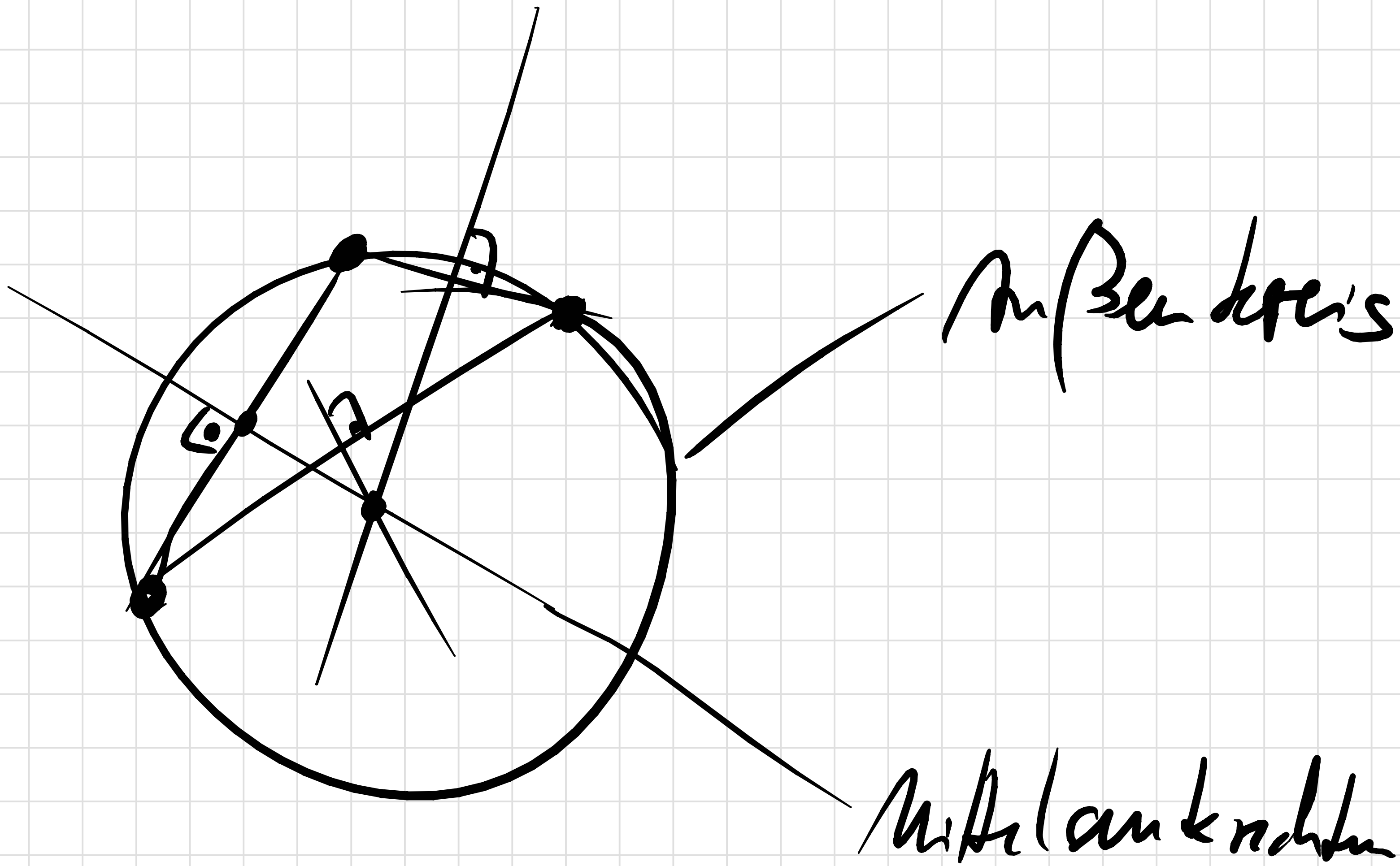
$$\Rightarrow \alpha + \beta + \gamma = 180^\circ$$

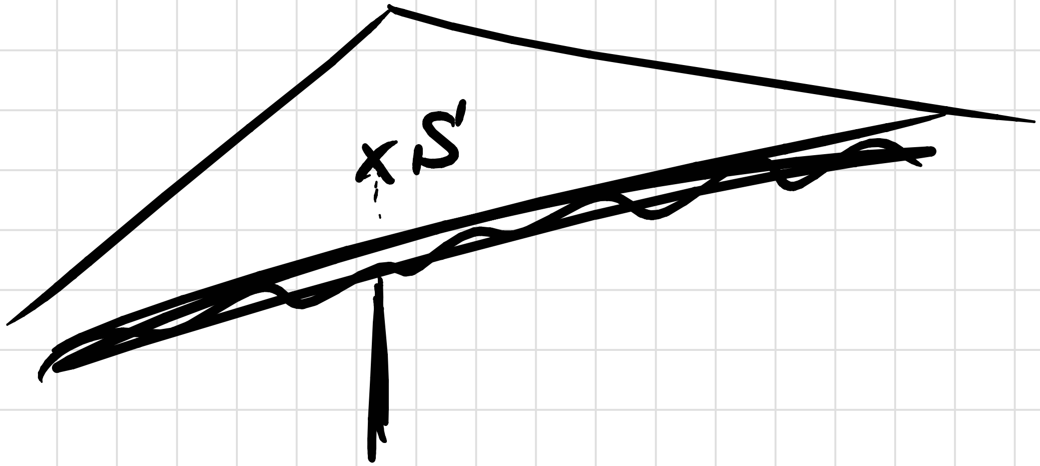


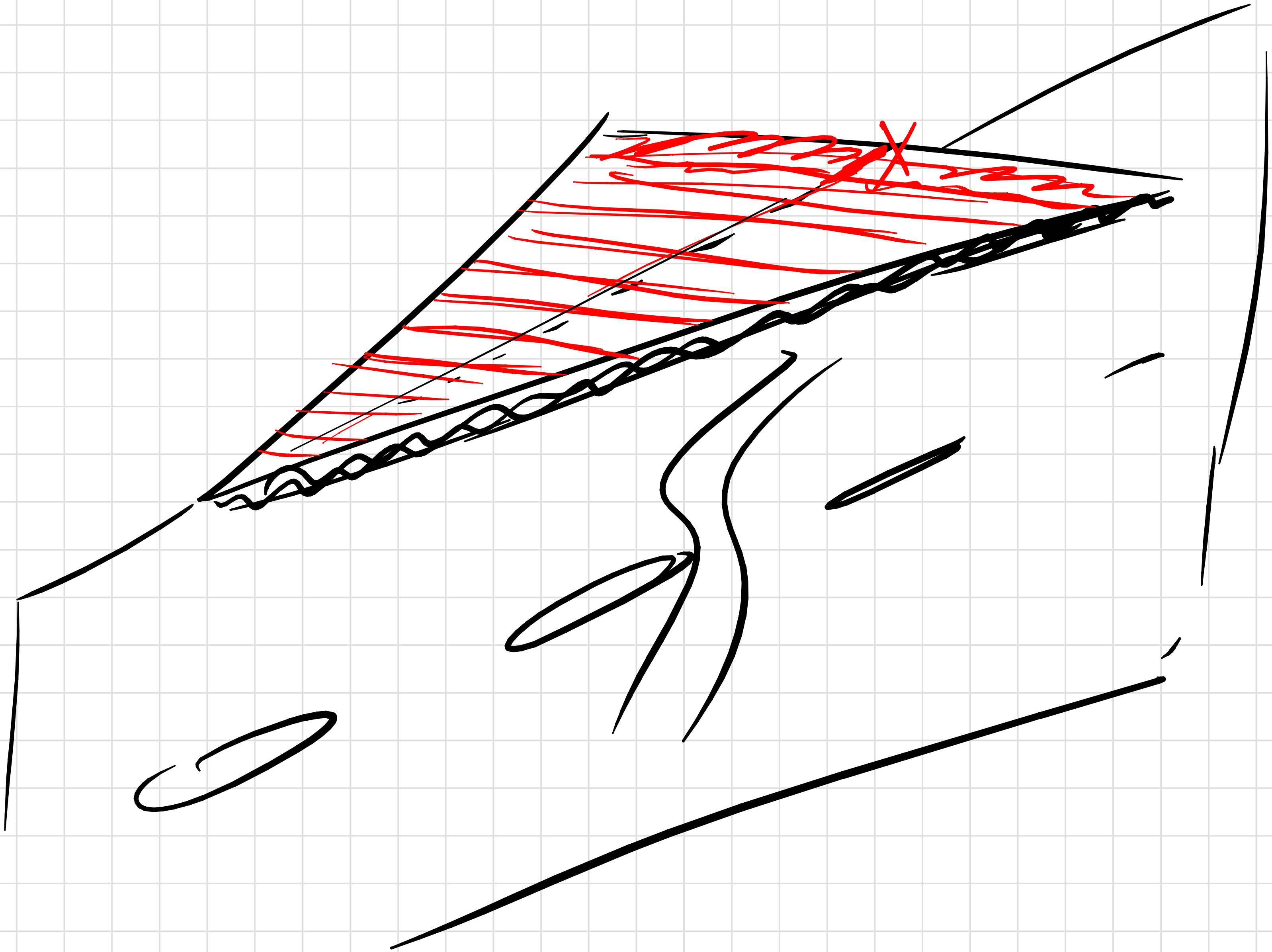
Fläche △

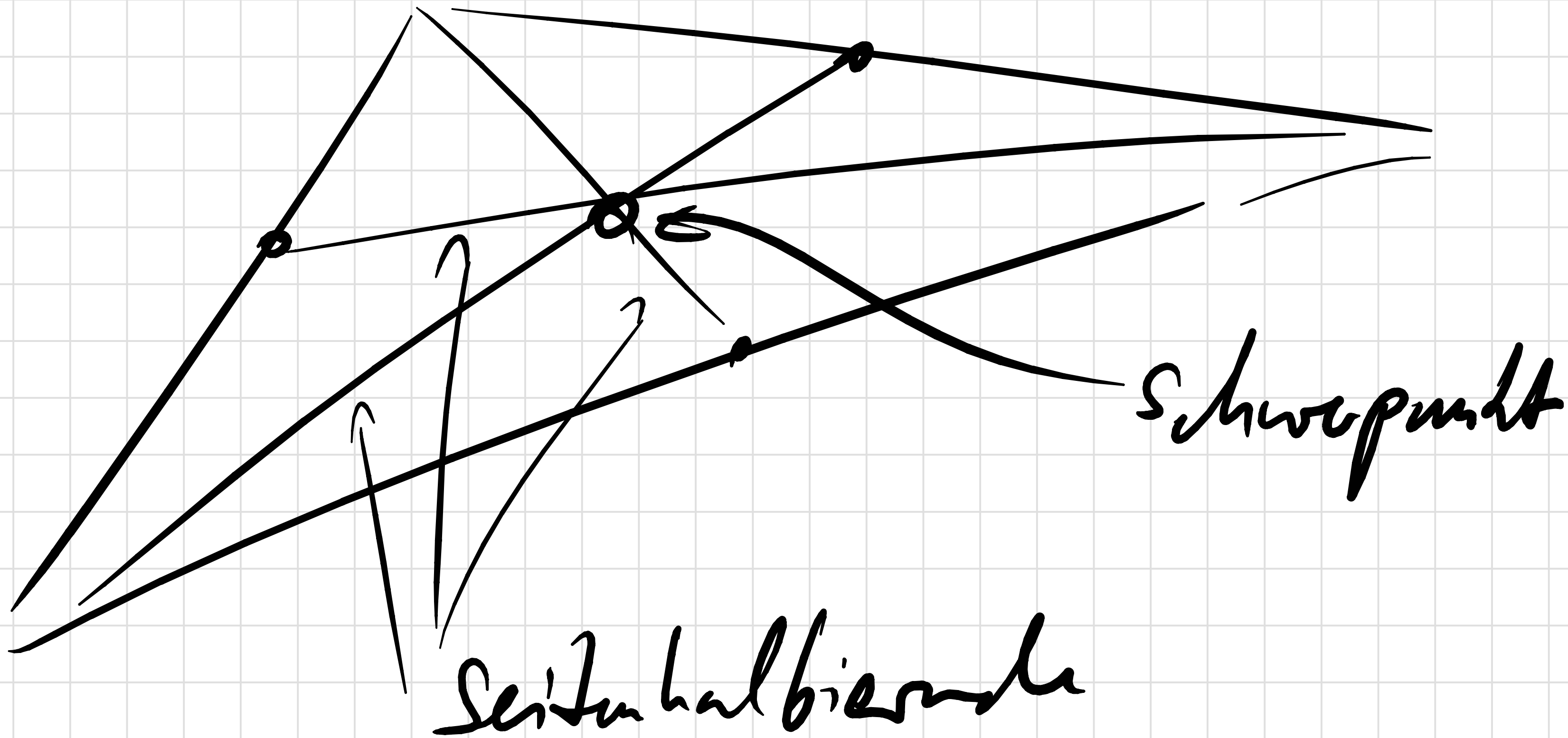
$= \frac{1}{2}$ Grundlinie · Höhe


Innenkreis
Winkelhalbierende

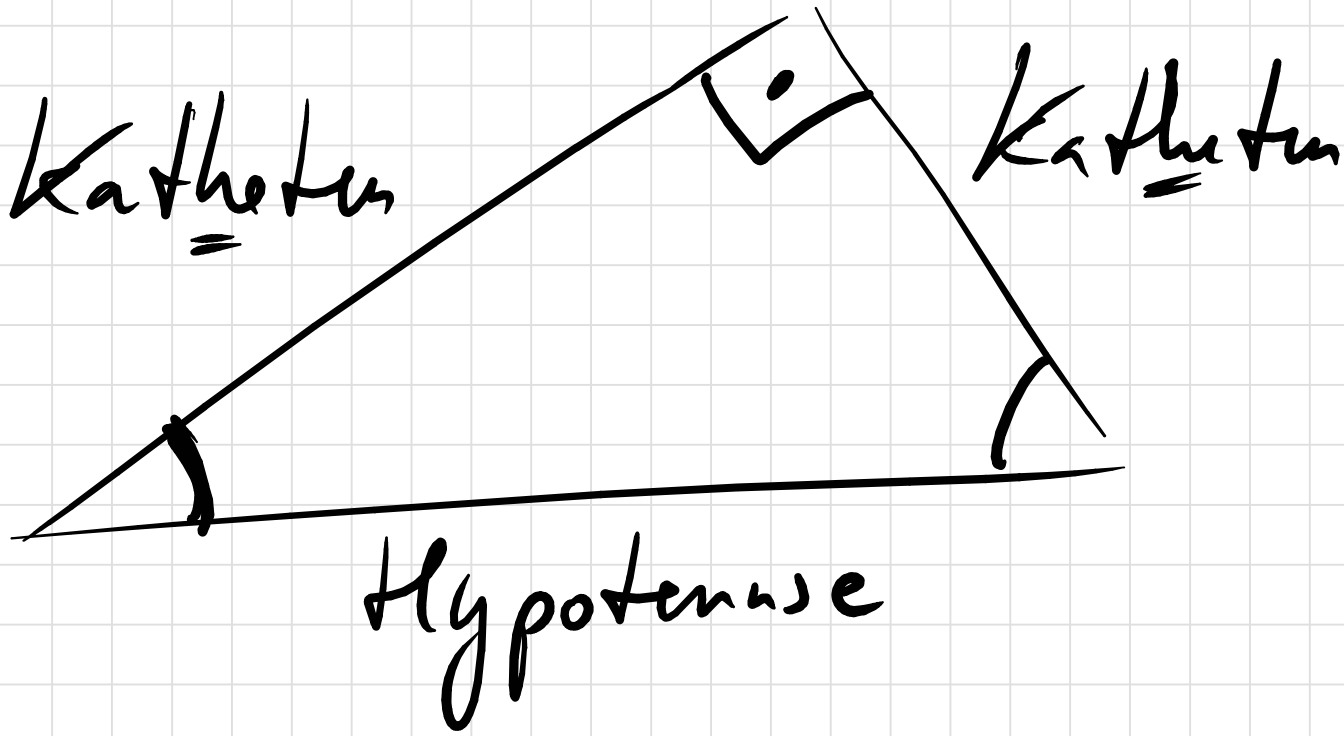

Außenkreis
Mittelsenkrechten


x S'

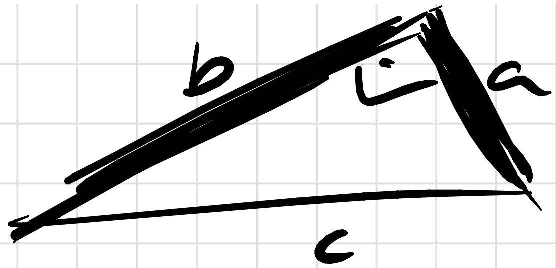


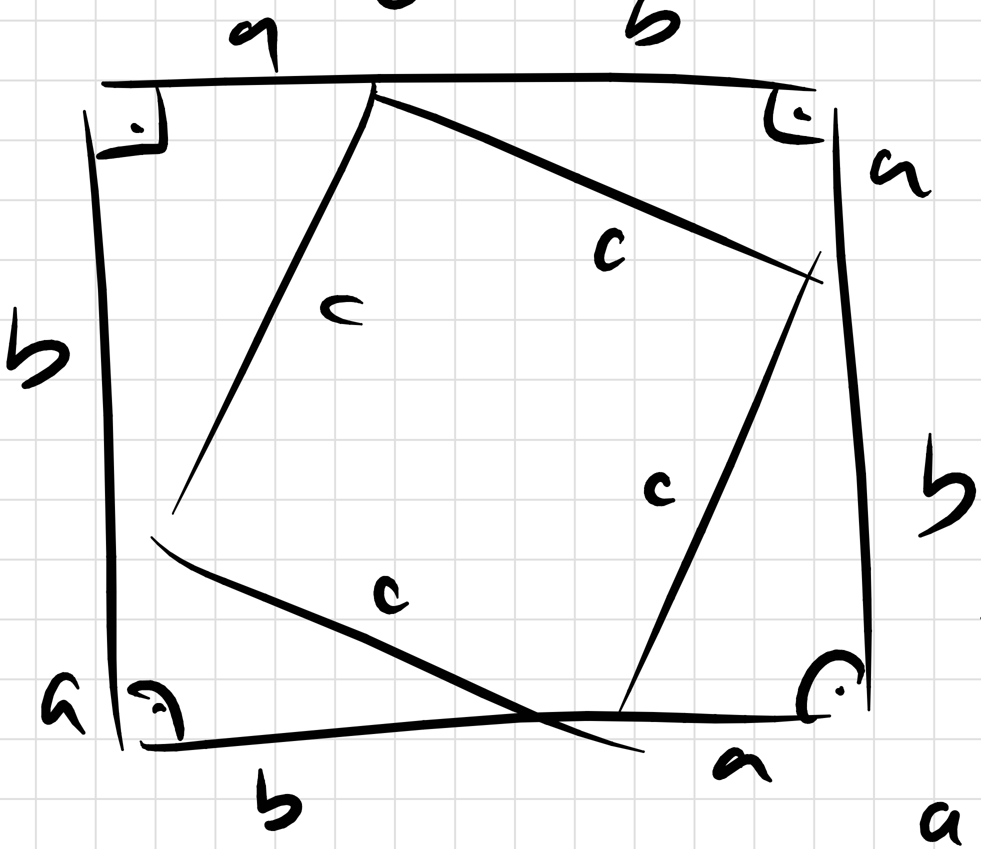

Schwerpunkt
Seitenhalbierende

Rechtwinkliges Dreieck



Pythagoras





Fläche =

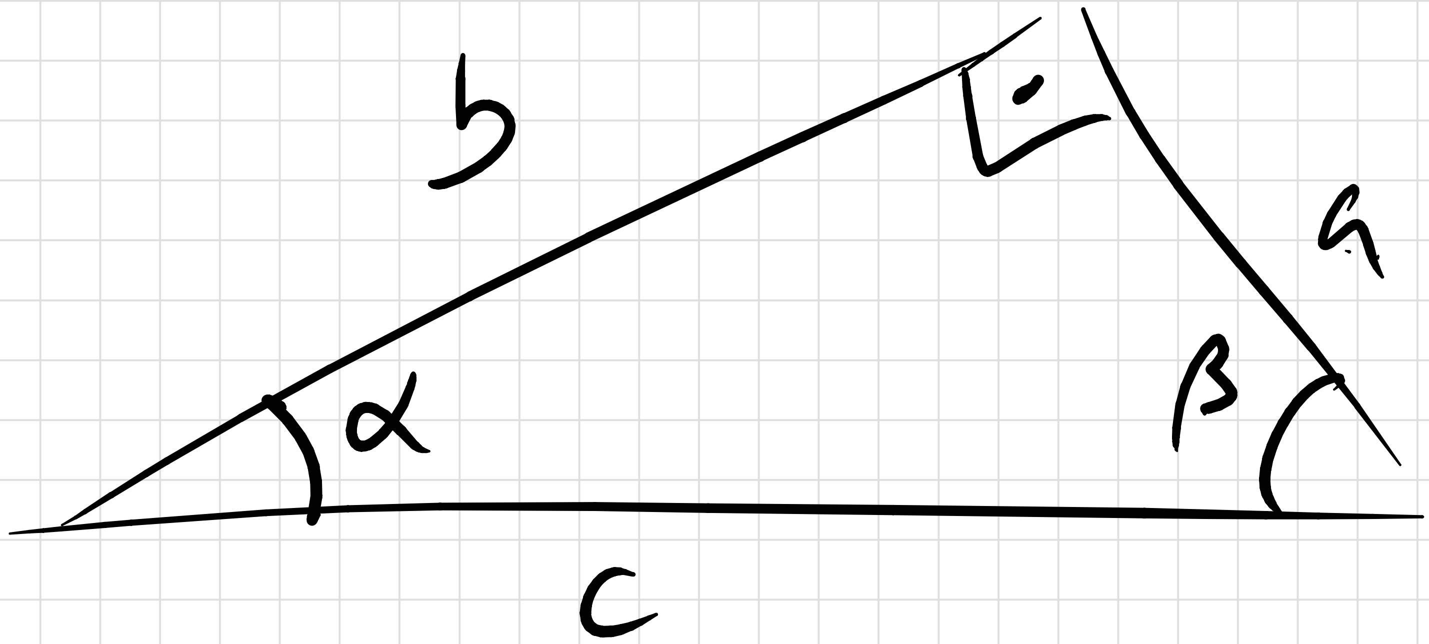
$$(a+b)^2$$

$$= c^2 + 4 \cdot \frac{1}{2} ab$$

Also:

$$a^2 + \cancel{2ab} + b^2 = c^2 + \cancel{2ab} \quad \| -2ab$$

Sinus & Cosinus



$$\sin(\alpha) = \frac{a}{c} = \frac{Gk_\alpha}{HY} = \frac{Ak_\beta}{HY} = \cos(\beta)$$

$$\cos(\alpha) = \frac{b}{c} = \frac{AK_\alpha}{HY} = \frac{GK_\beta}{HY} = \sin(\beta)$$

$$\tan(\alpha) = \frac{a}{b} = \frac{GK_\alpha}{AK_\alpha} = \frac{AK_\beta}{GK_\beta} = \cot(\beta)$$

$$\cot(\alpha) = \frac{b}{a} = \frac{AK_\alpha}{GK_\alpha} = \frac{1}{\tan(\alpha)}$$

$$= \dots = \tan(\beta) = \frac{1}{\cot(\beta)}$$

$$\tan(\alpha) = \frac{a}{b} = \frac{\frac{a}{c}}{\frac{b}{c}} = \frac{\sin(\alpha)}{\cos(\alpha)}$$

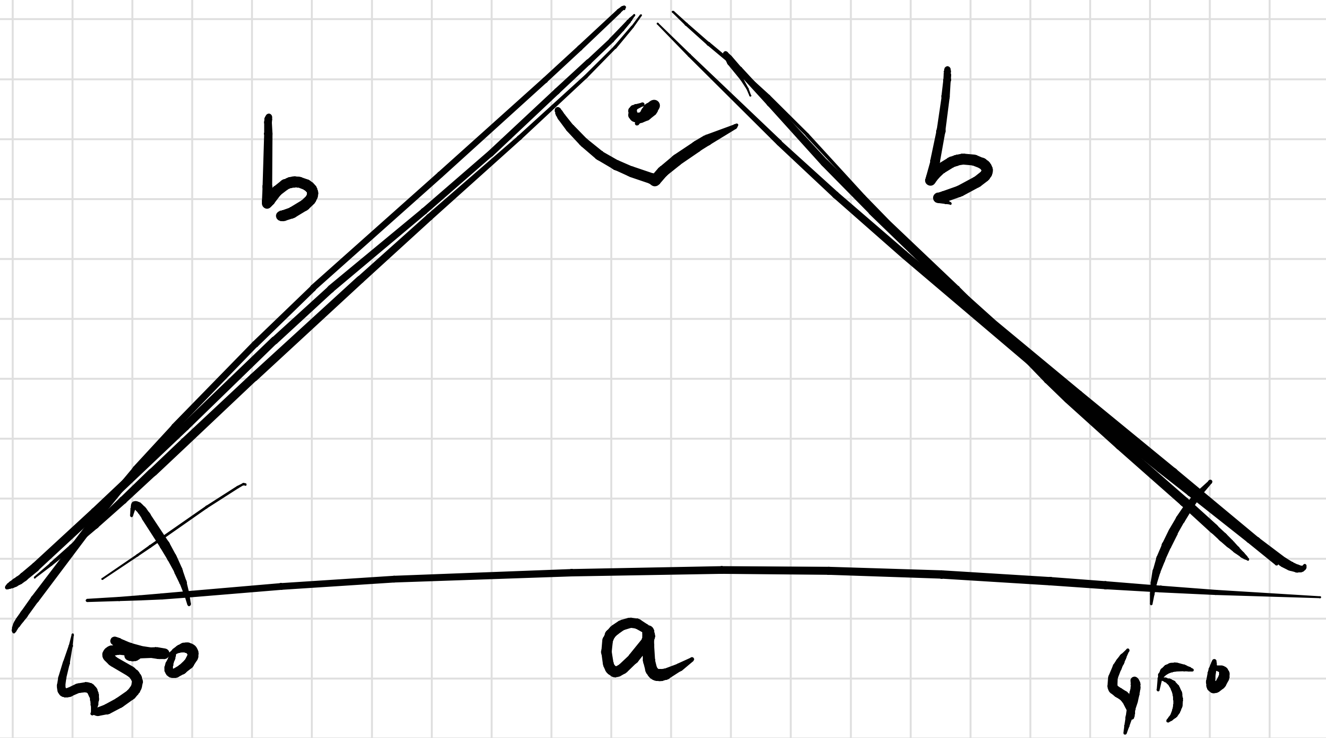
Pythagoras:

$$a^2+b^2=c^2$$

$$\sin^2(\alpha)+\cos^2(\alpha)=\frac{a^2}{c^2}+\frac{b^2}{c^2}=\frac{a^2+b^2}{c^2}$$

$$=\frac{c^2}{c^2}=1.$$

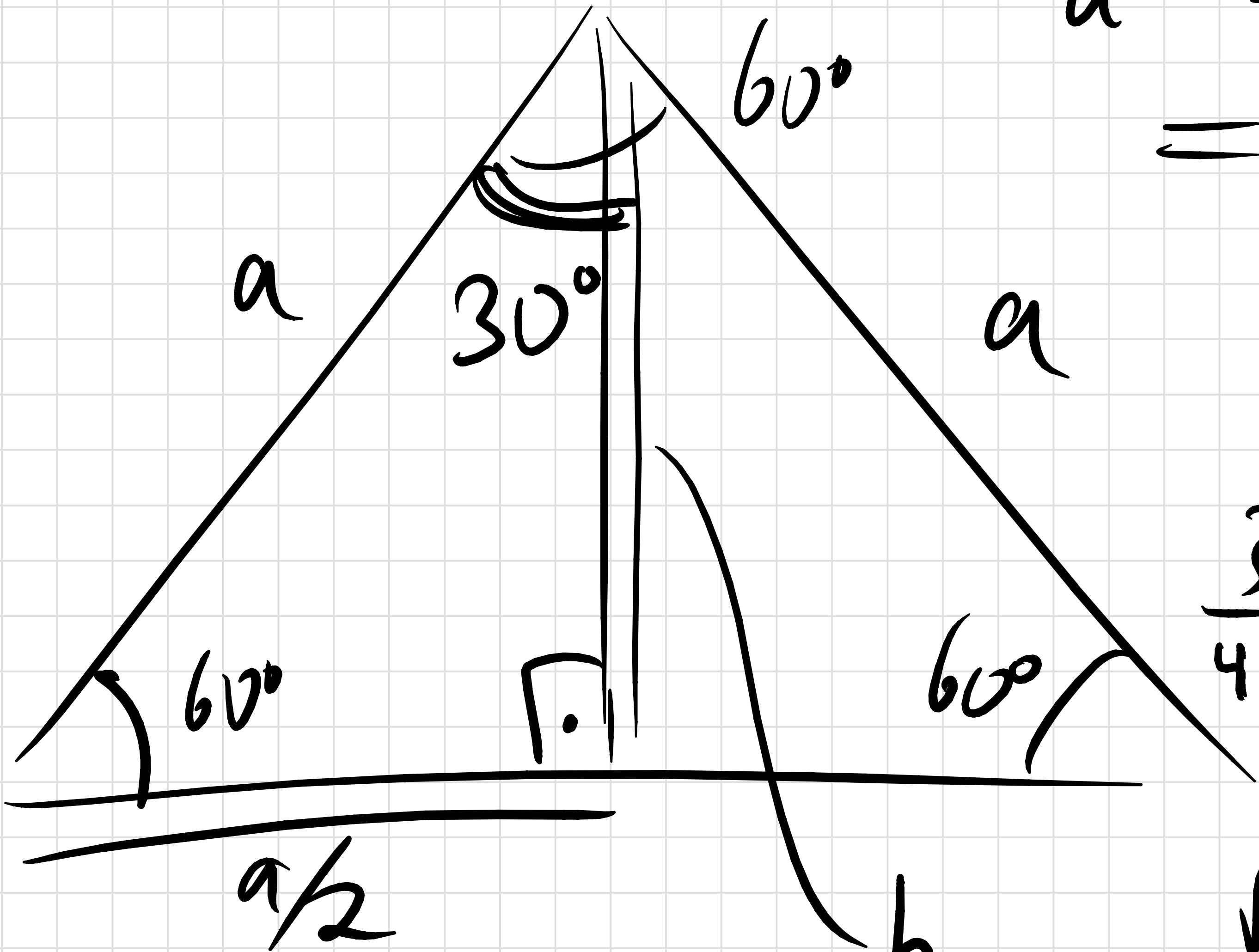
φ	$\sin(\varphi)$	$\cos(\varphi)$	$\tan(\varphi)$	$\cot(\varphi)$
$0^\circ = 0$	0	1	0	n.d.
$30^\circ = \pi/6$	$1/2$	$\sqrt{3}/2$	$1/\sqrt{3}$	$\sqrt{3}$
$45^\circ = \pi/4$	$1/\sqrt{2}$	$1/\sqrt{2}$	1	1
$60^\circ = \pi/3$	$\sqrt{3}/2$	$1/2$	$\sqrt{3}$	$1/\sqrt{3}$
$90^\circ = \pi/2$	1	0	n.d.	0



Pythagoras: $b^2 + b^2 = a^2$

$\Rightarrow 2b^2 = a^2 \Rightarrow \sqrt{2}\, b = a$

$$\sin(45°) = \frac{b}{a} = \frac{\cancel{b}}{\sqrt{2}\cancel{b}} = \frac{1}{\sqrt{2}}$$



$$a^2 = b^2 + \left(\frac{a}{2}\right)^2$$

$$= b^2 + \frac{a^2}{4}$$

$$\Downarrow$$

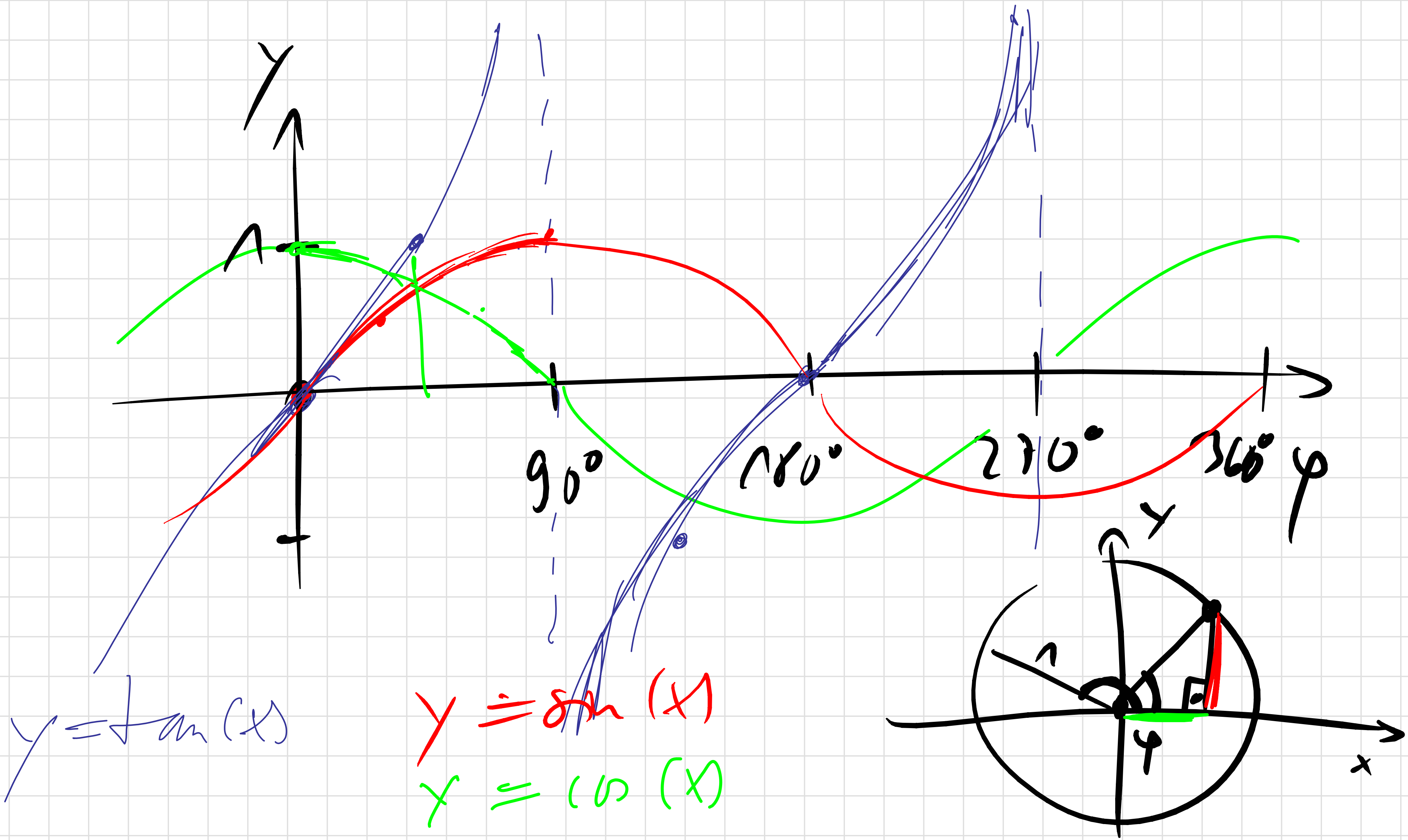
$$\frac{3}{4}a^2 = b^2$$

$$\Downarrow$$

$$\frac{\sqrt{3}}{2}a = b$$

$$\sin(60^\circ) = \frac{b}{a} = \frac{\frac{\sqrt{3}}{2}\cancel{a}}{\cancel{a}} = \frac{\sqrt{3}}{2}$$

$$\cos(60^\circ) = \frac{a/2}{a} = \frac{\frac{\cancel{a}}{2}}{\cancel{a}} = \frac{1}{2}$$



$y = \tan(x)$

$y = \sin(x)$

$y = \cos(x)$

Additionstheoreme

$$\sin(\underline{\alpha+\beta}) = \sin(\alpha)\cos(\beta) + \cos(\alpha)\sin(\beta)$$

$$\sin(x + 42°)$$

$\cos(42°)$ $\quad$ $\sin(42°)$

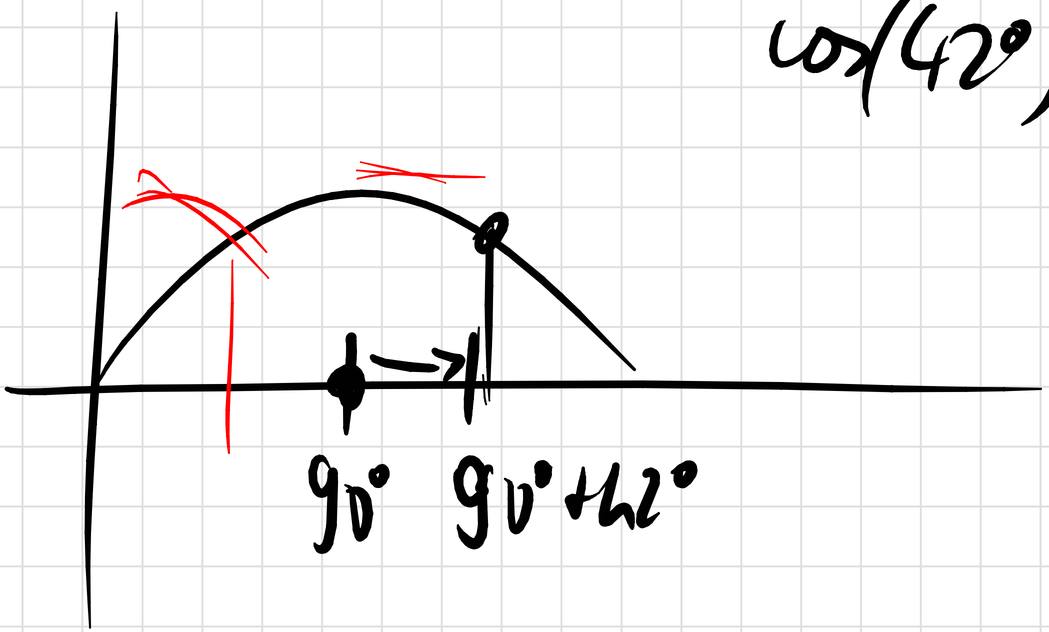
$$= A \sin(x) + B \cos(x)$$

mit $A = ?$, $B = ?$

$$x = 0^\circ \Rightarrow \sin(42^\circ) = \cancel{A \sin(0)} + B \cancel{\cos(0)} = B$$

$$x = 90^\circ \Rightarrow \underbrace{\sin(90^\circ + 42^\circ)}_{\cos(42^\circ)} = A \underbrace{\cancel{\sin(90^\circ)}}_{1} + B \underbrace{\cancel{\cos(90^\circ)}}_{0}$$

$$= A$$



$$\cos(\alpha+\beta) = \cos(\alpha)\cos(\beta) - \sin(\alpha)\sin(\beta)$$

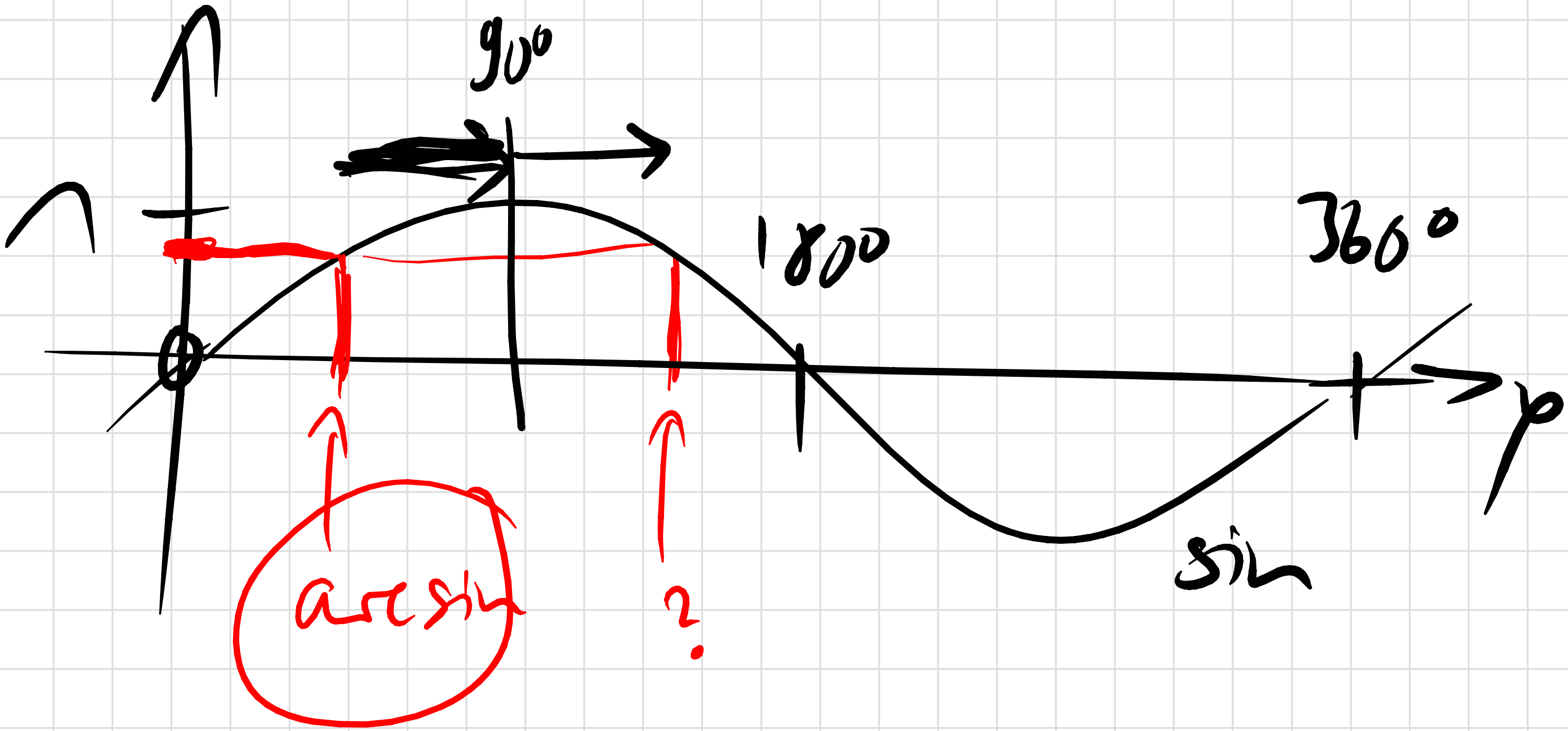
$$e^{j\varphi} = \cos\varphi + j\sin\varphi$$

$\alpha+\beta$

Arcusfunktionen

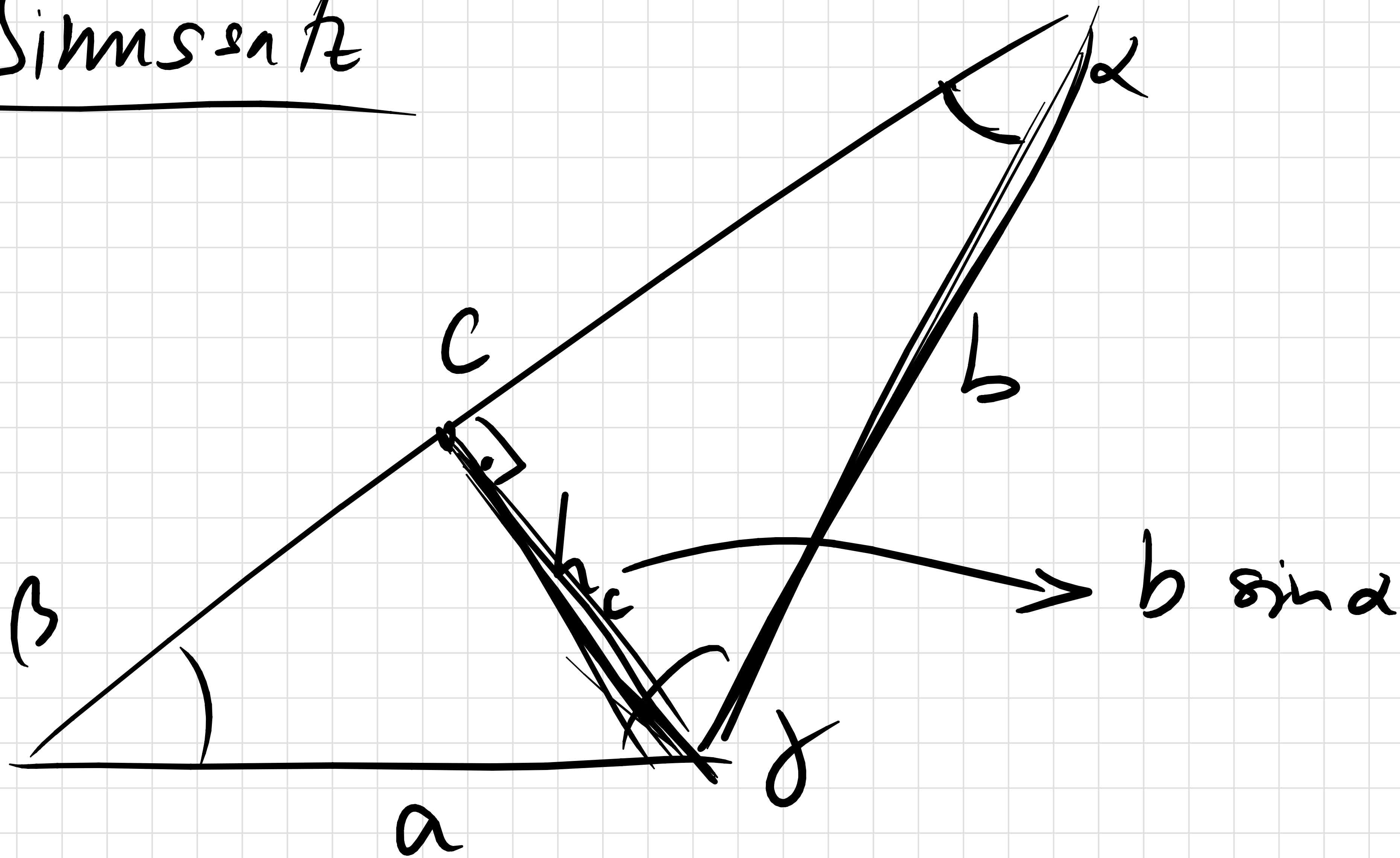
$$\sin(\varphi) = 0{,}93 \quad | \arcsin$$

$$\varphi = \arcsin(0{,}93)$$



90°
180°
360°
0
arcsin
?
sin

Sinussatz



$$\text{Fläche} = \frac{1}{2}\, a \cdot h_a = \frac{1}{2} \cdot a \cdot c \cdot \sin\beta$$

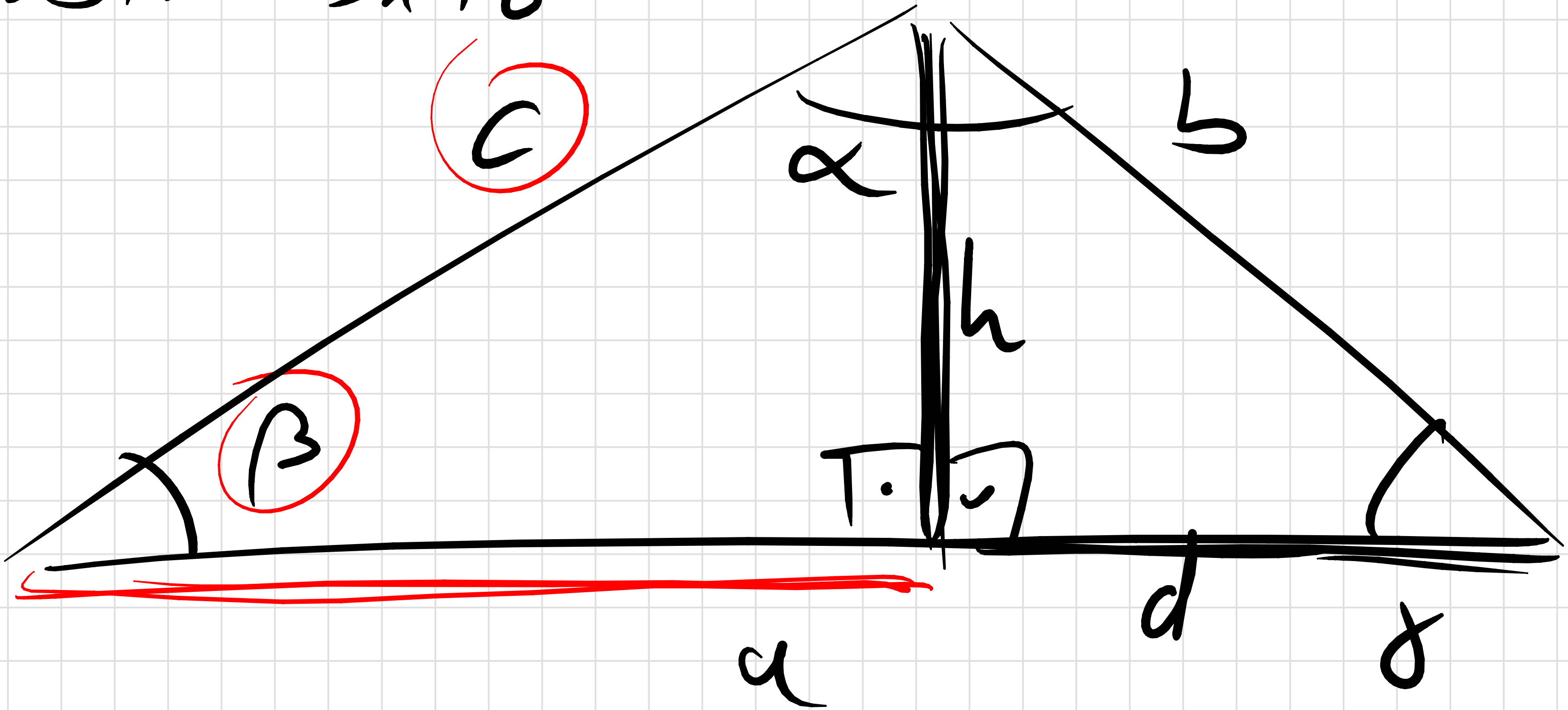
$$= \frac{1}{2} c \cdot h_c = \frac{1}{2} c \cdot b \sin\alpha$$

$$\Longrightarrow \cancel{\tfrac{1}{2}}\, a\, \cancel{c} \sin\beta = \cancel{\tfrac{1}{2}}\, \cancel{c}\, b \sin\alpha$$

$$\Longrightarrow a \sin\beta = b \sin\alpha \quad \| : a \quad : b$$

$$\Longrightarrow \frac{\sin\beta}{b} = \frac{\sin\alpha}{a} = \frac{\sin\gamma}{c}$$

Cosinussatz



$b^2 = d^2 + h^2$; $h = c \sin\beta$

$d = a - c\cos\beta$

$$\hookrightarrow = (a - c\cos\beta)^2 + (c\sin\beta)^2$$

$$= a^2 - 2ac\cos\beta + c^2\cos^2\beta$$

$$+ c^2\sin^2\beta$$

$$= a^2 - 2ac\cos\beta + c^2\underbrace{(\cos^2\beta + \sin^2\beta)}_{1}$$

$$= a^2 + c^2 - 2ac\cos\beta$$

$$a^2 = b^2 + c^2 - 2bc\cos\alpha$$

$$c^2 = a^2 + b^2 - 2ab\cos\gamma$$

A	α	Alpha
B	β	Beta
Γ	γ	Gamma
Δ	δ	Delta
E	ε	Epsilon
Z	ζ	Zeta

H	η	Eta
Θ	ϑ	Theta
I	ι	Iota
K	$\varkappa$	Kappa
Λ	λ	Lambda
M	μ	Mu
N	ν	Nu
Ξ	ξ	Xi

O	o	Omikron
Π	π	Pi
Σ	σ	Sigma
T	τ	Tau
Υ	υ	Ypsilon
Φ	φ	Phi
Ψ	ψ	Psi
Ω	ω	Omega