Mitschrieb
Mathematik 1
Vorlesung vom 10.10.2023

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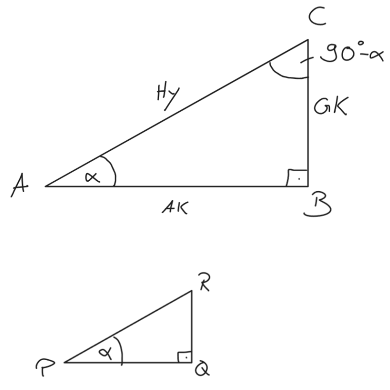
Infos vorraus

AC ≙ Vector
|AC| ≙ Stecke
||AC|| ≙ Länge



$$\sin\alpha = \frac{Gk}{Hy} = \frac{||BC||}{||AC||} = \frac{||CB||}{||CA||}$$
$$\cos\alpha = \frac{Ak}{Hy} = \frac{||AB||}{||AC||}$$
$$\tan\alpha = \frac{Gk}{Ak} = \frac{\sin\alpha}{\cos\alpha}$$
$$\cot\alpha = \frac{\cos\alpha}{\sin\alpha}$$

$$\sin(90-\alpha) = \frac{||AB||}{||AC||} = \cos\alpha$$

Zwei Dreiecke sind ähnlich wenn deren Winkel gleich gross sind.

$$\Delta ABC \backsim \Delta PQR \Rightarrow \frac{||AC||}{||PR||} = \frac{||BC||}{||QR||} = \frac{||AB||}{||PQ||}$$

SATZ DES THALES!!!

Positionen und Gradmass zu Bogenmass

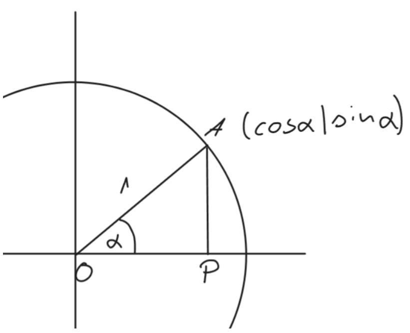
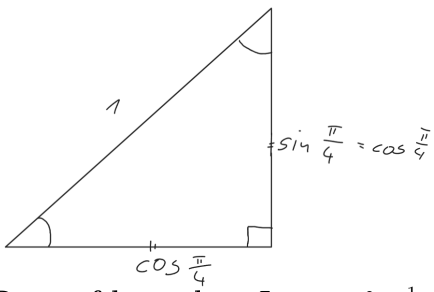


Tabelle mit Grad zu Bogenmass

$$360° \hat{=} 2\pi$$
$$180° \hat{=} \pi$$
$$90° \hat{=} \frac{\pi}{2}$$
$$60° \hat{=} \frac{\pi}{3}$$
$$45° \hat{=} \frac{\pi}{4}$$
$$30° \hat{=} \frac{\pi}{6}$$
$$\cos(-\alpha) = \cos\alpha$$
$$\sin(-\alpha) = -\sin\alpha$$
$$\sin(90-\alpha) = cos\alpha$$
$$\cos(90-\alpha) = \sin\alpha$$
$$\sin^2\alpha + \cos^2\alpha = 1$$

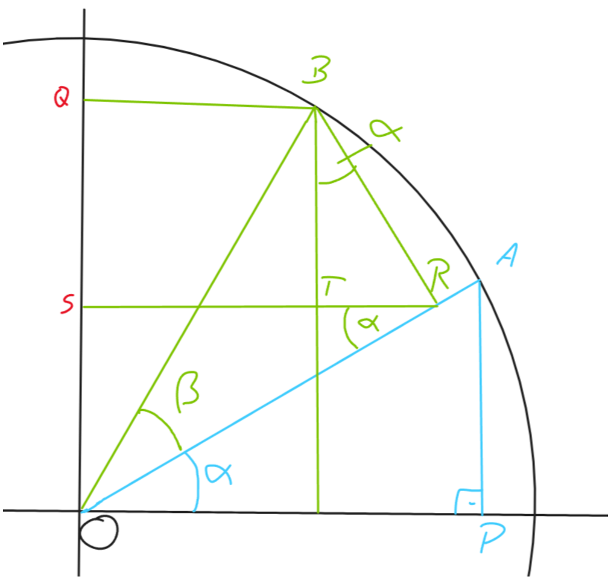
Herleitung von $\sin\frac{\pi}{4}$



$$\sin^2\frac{\pi}{4}+\cos^2\frac{\pi}{4}=1$$
$$\Rightarrow 2\sin^2\frac{\pi}{4}=1$$
$$\Rightarrow \sin^2\frac{\pi}{4}=\frac{1}{2}$$
$$\Rightarrow \sin\frac{\pi}{4}=\sqrt{\frac{1}{2}}$$

Daraus folgt auch $\sin\frac{\pi}{6}=\sin 30^\circ=\frac{1}{2}$

Beweis von $\sin(\alpha+\beta)=\sin\alpha\cos\beta+\cos\alpha\sin\beta$



Voraussetzungen:

$||OP|| = \cos\alpha$
$||AP|| = \sin\alpha$
$||OQ|| = \sin(\alpha+\beta)$
$||BR|| = \sin\beta$
$||OR|| = \cos\beta$

$$\sin(\alpha+\beta)$$

$||OQ|| = ||OS|| + ||SQ||$