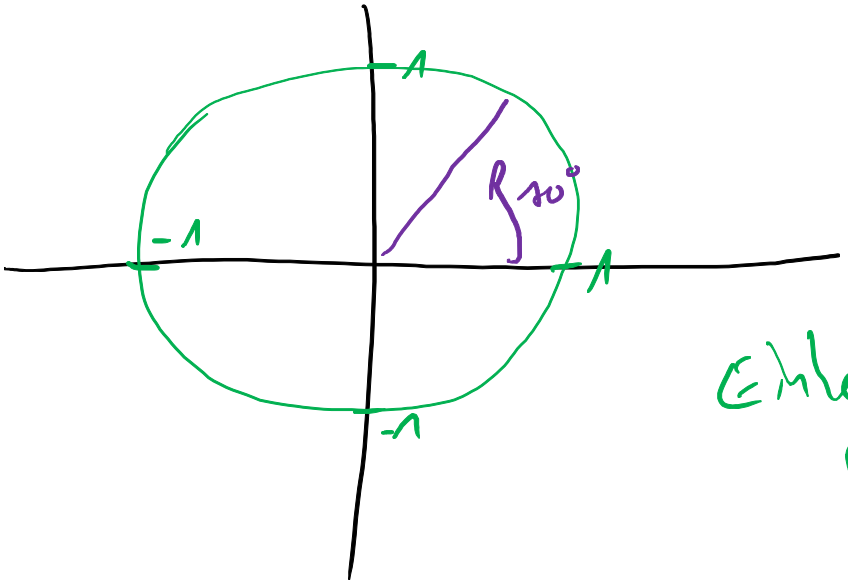
Kap 1.3

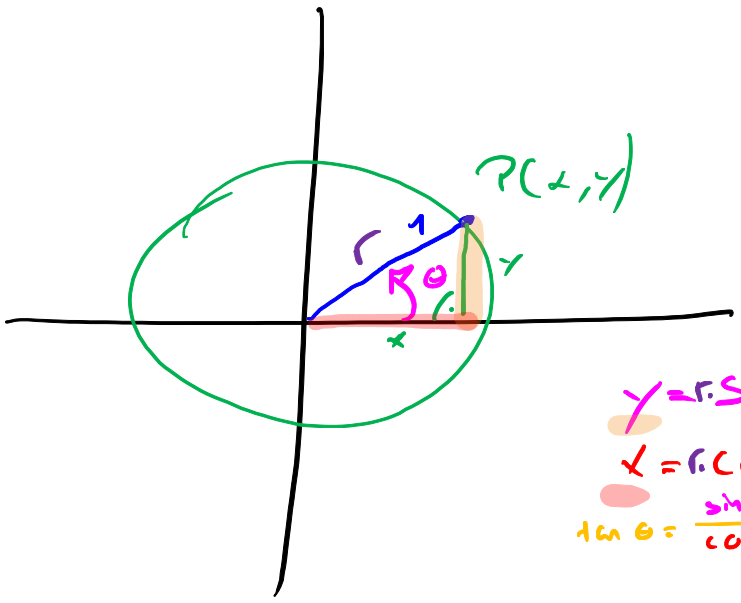
Work



Einheitskreis:
$r = 1$

1. Umlauf $360°$
$360° \triangleq 2\pi$

Bsp.: $\frac{60°}{360°} = \frac{1}{6} \Rightarrow \frac{2\pi}{6} = \frac{\pi}{3}$

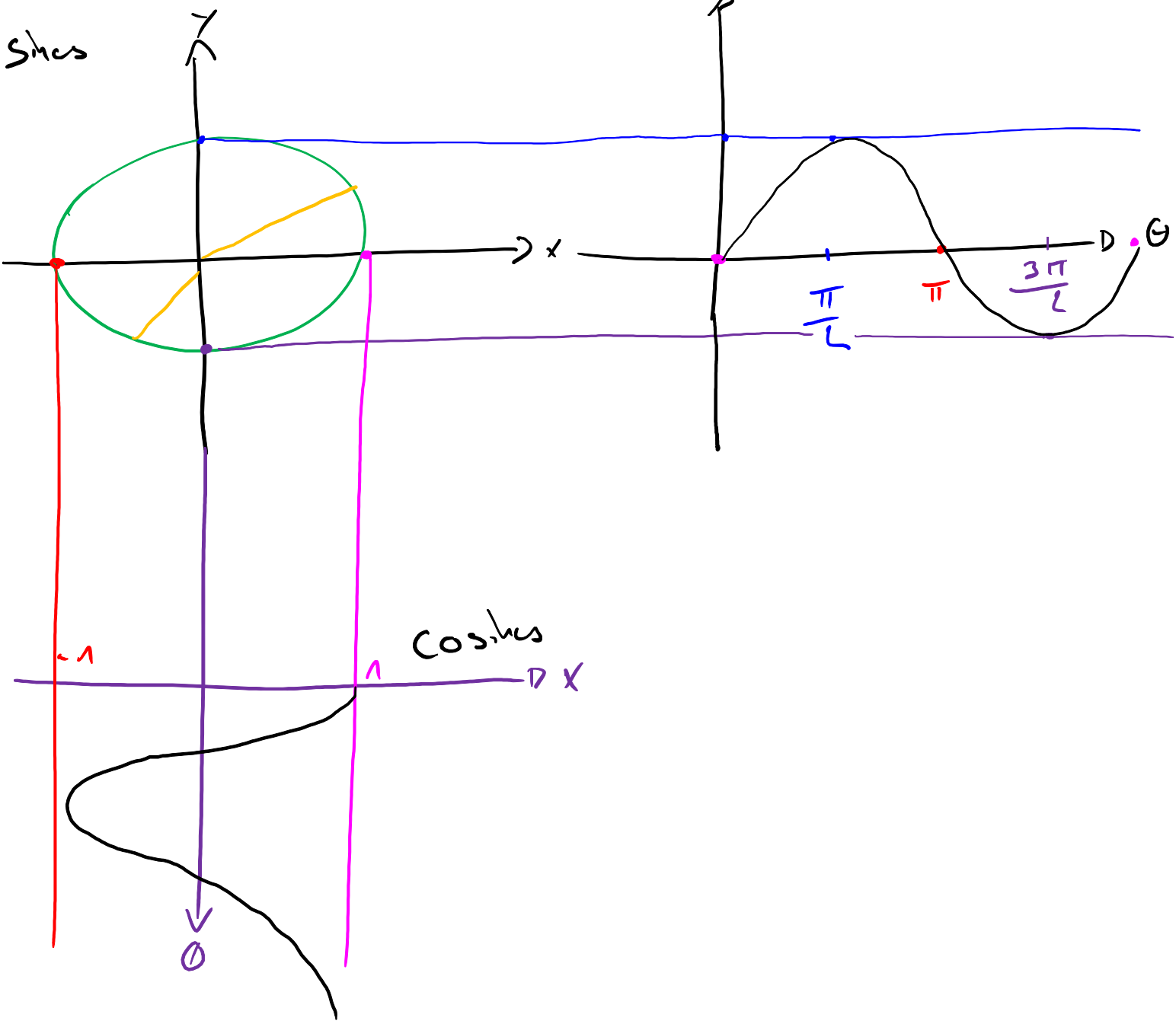


$x^2 + y^2 = 1$

$y = r \cdot \sin\theta \Rightarrow \sin\theta = \frac{y}{r}$

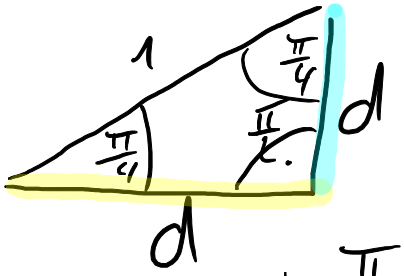
$x = r \cdot \cos\theta \Rightarrow \cos\theta = \frac{x}{r}$

$\tan\theta = \frac{\sin\theta}{\cos\theta}$ oder $\tan\theta = \frac{y}{x}$


Sinus
Y
x
D
θ
π/L
π
3π/L
Cosinus
-1
1
D X
0

Bsp.:

1) $\Theta = 45° = \frac{\pi}{4}$



$\cos\frac{\pi}{4} = d = \frac{\sqrt{2}}{2}$

$\sin\frac{\pi}{4} = \frac{\sqrt{2}}{2}$

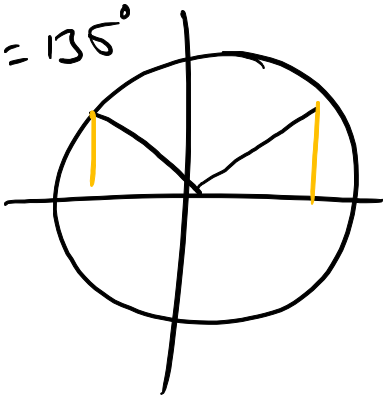
$d^2 + d^2 = 1^2$

$2d^2 = 1$

$d^2 = \frac{1}{2}$

$d = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

2) $\frac{3\pi}{4} = 135°$



$\sin\frac{3\pi}{4} = \sin\frac{\pi}{4}$

Additionstheorem

$$\cos\frac{\pi}{4} = \frac{\sqrt{2}}{2} \qquad (45^\circ)$$

$$\cos\frac{\pi}{3} = \frac{1}{2} \qquad (60^\circ)$$

$$\frac{\pi}{4} + \frac{\pi}{3} = \frac{3\pi + 4\pi}{12} = \frac{7\pi}{12} \qquad (105^\circ)$$

$$\cos\left(\frac{7\pi}{12}\right) = \cos\left(\frac{\pi}{4} + \frac{\pi}{3}\right)$$

$$= \cos\frac{\pi}{4} \cdot \cos\frac{\pi}{3} - \sin\frac{\pi}{4} \cdot \sin\frac{\pi}{3}$$

$$= \frac{\sqrt{2}}{2} \cdot \frac{1}{2} - \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2}$$

$$= \frac{\sqrt{2}}{4} - \frac{6}{4}$$

Doppelwinkelformel

$$\alpha = \beta = \theta$$

$$\cos 2\theta = \cos^2\theta - \sin^2\theta$$

Halbwinkelformel

$$\cos 2\theta = \cos^2\theta - \sin^2\theta$$

$$1 = \cos^2\theta + \sin^2\theta$$

$$1 + \cos 2\theta = 2\cos^2\theta$$

$$\cos^2\theta = \frac{1 + \cos 2\theta}{2}$$

Kosinussatz → gilt immer

→ wenn 3-eck kein rechter Winkel

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