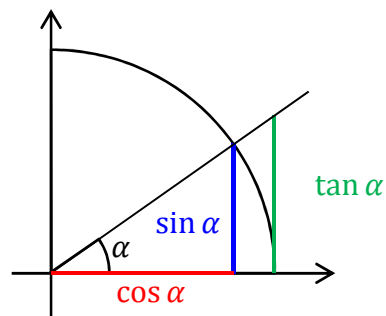


Sinus, Kosinus und Tangens am Einheitskreis – Lösung

1. a) Falsch, da der Wert vom Sinus ansteigt für größere Werte.
- b) Falsch, da beide den Wert 1 haben.
- c) Wahr, aufgrund der Lage am Einheitskreis (Strahlensatz)
- d) Falsch, da $\tan 50^\circ$ schon einen Wert über 1 annimmt.
- e) Wahr, da der Wert vom Sinus bis zu 90° ansteigt.

2. a) $\sin 37^\circ \approx 3/5 = 0,6$
- b) $\cos 37^\circ \approx 4/5 = 0,8$
- c) $\tan 20^\circ \approx 1,8/5 = 0,36$
- d) $\cos 65^\circ \approx 2,1/5 = 0,42$

Skizze:



3. Gegeben ist $\sin \alpha = 0,2 = \frac{1}{5}$

$$\sin^2 \alpha + \cos^2 \alpha = 1 \Rightarrow \cos \alpha = \sqrt{1 - \left(\frac{1}{5}\right)^2} = \sqrt{\frac{24}{25}} = \frac{\sqrt{24}}{5}$$

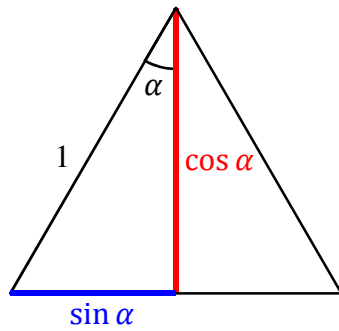
$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha} = \frac{\frac{1}{5}}{\frac{\sqrt{24}}{5}} = \frac{1}{\sqrt{24}}$$

$$\cos(90^\circ - \alpha) = \mathbf{0,2}$$

$$\sin(90^\circ - \alpha) = \frac{\sqrt{24}}{5}$$

$$\tan(90^\circ - \alpha) = \frac{\sin(90^\circ - \alpha)}{\cos(90^\circ - \alpha)} = \frac{\frac{\sqrt{24}}{5}}{\frac{1}{5}} = \mathbf{\sqrt{24}}$$

4. a) $\sqrt{1 - \sin \gamma} \cdot \sqrt{1 + \sin \gamma} = \sqrt{1 - \sin^2 \gamma} = \sqrt{\cos^2 \alpha} = \mathbf{\cos \alpha}$
- b) $\tan \alpha \cdot \frac{\cos^2 \alpha}{\sin \alpha} = \frac{\sin \alpha}{\cos \alpha} \cdot \frac{\cos^2 \alpha}{\sin \alpha} = \mathbf{\cos \alpha}$
- c) $\tan^2 \alpha \cdot \sin^2(90^\circ - \alpha) = \frac{\sin^2 \alpha}{\cos^2 \alpha} \cdot \cos^2 \alpha = \mathbf{\sin^2 \alpha}$
- d) $1 - \sqrt{\sin^2 \alpha \cdot \cos^2(90^\circ - \alpha)} = 1 - \sqrt{\sin^2 \alpha \cdot \sin^2 \alpha} = 1 - \sin^2 \alpha = \mathbf{\cos^2 \alpha}$

5. Skizze:

$$\sin 30^\circ = \frac{1}{2}$$

$$1^2 = \left(\frac{1}{2}\right)^2 + \cos^2 30^\circ \Rightarrow \cos 30^\circ = \sqrt{1 - \frac{1}{4}} = \sqrt{\frac{3}{4}} = \frac{1}{2}\sqrt{3}$$

$$\tan 30^\circ = \frac{\sin 30^\circ}{\cos 30^\circ} = \frac{\frac{1}{2}}{\frac{1}{2}\sqrt{3}} = \frac{1}{\sqrt{3}}$$

6. a) $\sin 25^\circ - 2 \cos 65^\circ = \sin 25^\circ - 2 \sin(90^\circ - 65^\circ) = \sin 25^\circ - 2 \sin 25^\circ = -\sin 25^\circ$

b) $\cos 78^\circ + 2 \sin 12^\circ = \cos 78^\circ + 2 \cos 78^\circ = 3 \cos 78^\circ$

c) $\sin 30^\circ + 2 \cos 45^\circ + \cos 60^\circ = \frac{1}{2} + 2 \cdot \frac{1}{2}\sqrt{2} + \frac{1}{2} = 1 + \sqrt{2}$

d) $\cos 90^\circ - 2 \sin 0^\circ = 0 - 0 = 0$

e) $\sin 45^\circ + \tan 45^\circ - \cos 45^\circ = \frac{1}{2}\sqrt{2} + 1 - \frac{1}{2}\sqrt{2} = 1$