Umformungen mit Sinus, Kosinus und Tangens – Lösung

1. a) $\cos 165° = -\cos(180° - 165°) = \mathbf{-\cos 15°}$
   b) $\sin 275° = -\sin(360° - 275°) = \mathbf{-\sin 85°}$
   c) $\cos 315° = \cos(360° - 315°) = \cos 45° = \mathbf{\frac{1}{2}\sqrt{2}}$
   d) $\sin 293° = -\sin(360° - 293°) = \mathbf{-\sin 67°}$
   e) $\sin 197° = \mathbf{-\sin 17°}$
   f) $\cos 183° = \mathbf{-\cos 3°}$
   g) $\sin 253° = \mathbf{-\sin 73°}$
   h) $\sin 111° = \mathbf{\sin 69°}$
   i) $\cos 344° = \mathbf{\cos 16°}$

2. a) $\cos 65° = \sin 25° = \mathbf{\sin 155°}$
   b) $\sin 275° = \mathbf{-\sin 95°}$
   c) $\sin 12° = \mathbf{\sin 168°}$

3. a) $\cos 140° + \sin 50° = -\cos 40° + \sin 50° = -\cos 40° + \cos 40° = \mathbf{0}$
   b) $\sin 280° - \cos 170° = -\sin 80° + \cos 10° = -\sin 80° + \sin 80° = \mathbf{0}$

4. a) $\sin 75° + \cos 345° - \cos 165° = \sin 75° + \cos 15° + \cos 15° = \mathbf{3\cos 15°}$
   b) $\sin 300° - \cos 150° + 2\cos 330° = -\sin 60° + \cos 30° + 2\cos 30° = 2\cos 30° = \mathbf{\sqrt{3}}$
   c) $\cos\alpha \cdot \tan\alpha = \mathbf{\sin\alpha}$

5. a) $\dfrac{(\sin 35°)^2 + (\cos 145°)^2}{\sin 30°} = \dfrac{(\sin 35°)^2 + (\cos 35°)^2}{\sin 30°} = \dfrac{1}{0{,}5} = \mathbf{2}$
   b) $\dfrac{\cos 45°}{(\cos 17°)^2 + (\sin 163°)^2} = \dfrac{\cos 45°}{(\cos 17°)^2 + (\sin 17°)^2} = \dfrac{\cos 45°}{1} = \mathbf{\frac{1}{2}\sqrt{2}}$
   c) $\dfrac{\sqrt{(1-(\cos\alpha)^2)}}{\cos\alpha} + \tan\alpha = \dfrac{\sqrt{(\sin\alpha)^2}}{\cos\alpha} + \tan\alpha = \dfrac{\sin\alpha}{\cos\alpha} + \tan\alpha = \mathbf{2\tan\alpha}$

6. a) $\sin\alpha = 0{,}5$; $\quad \mathbf{L = \{30°;\ 150°\}}$
   b) $\cos\alpha = 0{,}5$; $\quad \mathbf{L = \{60°;\ 300°\}}$
   c) $\cos 2\alpha = -1$; $\quad \mathbf{L = \{90°;\ 270°\}}$ **(Achtung: Werte werden mit 2 multipliziert)**
   d) $\sin\alpha = -\frac{1}{2}\sqrt{3}$; $\quad \mathbf{L = \{240°;\ 300°\}}$
   e) $\cos\alpha = \frac{1}{2}\sqrt{3}$; $\quad \mathbf{L = \{30°;\ 330°\}}$
   f) $1 - \tan\alpha = 0$; $\quad \mathbf{L = \{45°;\ 225°\}}$