Summensätze zu Sinus und Cosinus

Arbeitsblatt – Lösungen

6

a) $\sin(2\alpha) = \sin(\alpha + \alpha) = \sin\alpha \cdot \cos\alpha + \sin\alpha \cdot \cos\alpha = 2 \cdot \sin\alpha \cdot \cos\alpha$

b) $\cos(2\alpha) = \cos(\alpha + \alpha) = \cos\alpha \cdot \cos\alpha - \sin\alpha \cdot \sin\alpha = \cos^2\alpha - \sin^2\alpha$

7

a) $\cos 15° = \cos(45° - 30°) = \cos 45° \cdot \cos 30° + \sin 45° \cdot \sin 30°$

$= \sin 45° \cdot \sin 60° + \sin 45° \cdot \sin 30° = \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2} \cdot \frac{1}{2} = \frac{\sqrt{2}}{4}(\sqrt{3} + 1)$

b), c), d) $\frac{\sqrt{2}}{4}(\sqrt{3} - 1)$

e) $-0{,}5$ f) $-\frac{\sqrt{2}}{4}(\sqrt{3} - 1)$ g) 0 h) $-\frac{\sqrt{2}}{2}$

i) $\frac{\sqrt{2}}{4}(\sqrt{3} - 1)$ j) $0{,}5$ k) $\frac{\sqrt{2}}{4}(\sqrt{3} + 1)$ l) -1

8

a) $\cos(90° - \alpha) = \cos(90°) \cdot \cos\alpha + \sin 90° \cdot \sin\alpha = 0 \cdot \cos\alpha + 1 \cdot \sin\alpha = \sin\alpha$

b) $\cos(180° - \alpha) = \cos 180° \cdot \cos\alpha + \sin 180° \cdot \sin\alpha = -1 \cdot \cos\alpha + 0 \cdot \sin\alpha = -\cos\alpha$

c) $\cos(360° - \alpha) = \cos 360° \cdot \cos\alpha - \sin 360° \cdot \sin\alpha = 1 \cdot \cos\alpha - 0 \cdot \sin\alpha = \cos\alpha$

d) $\sin(90° + \alpha) = \sin 90° \cdot \cos\alpha + \cos 90° \cdot \sin\alpha = 1 \cdot \cos\alpha + 0 \cdot \sin\alpha = \cos\alpha$

e) $\sin(180° - \alpha) = \sin 180° \cdot \cos\alpha - \cos 180° \cdot \sin\alpha = 0 \cdot \cos\alpha - (-1) \cdot \sin\alpha = \sin\alpha$

f) $\sin(360° - \alpha) = \sin 360° \cdot \cos\alpha - \cos 360° \cdot \sin\alpha = 0 \cdot \cos\alpha - 1 \cdot \sin\alpha = -\sin\alpha$