

Mathematischer Brückenkurs (Mathe/Info) Antworten zum Übungsblatt 5
DR. ANTON MALEVICH

Aufgaben des Präsenzblattes

Aufgabe 5.1 a) $-\frac{\sqrt{2}}{2}$, b) $\frac{\sqrt{3}}{2}$, c) 1, d) $\frac{1}{2}$, e) 0, f) $\sqrt{3}$, g) $\sqrt{3}$.

Aufgabe 5.2

- a) $\sin \alpha = \frac{1}{5}$, $\cos \alpha = \frac{2\sqrt{6}}{5}$, $\tan \alpha = \frac{\sqrt{6}}{12}$;
b) $\sin \alpha = \frac{3\sqrt{5}}{7}$, $\cos \alpha = \frac{2}{7}$, $\tan \alpha = \frac{3\sqrt{5}}{2}$;
c) $\sin \alpha = \frac{3}{8}$, $\cos \alpha = \frac{\sqrt{55}}{8}$, $\tan \alpha = \frac{3\sqrt{55}}{55}$.

Aufgabe 5.3

- a) $\alpha = \frac{\pi}{4}$, $\beta = \frac{\pi}{3}$, $\gamma = \frac{5\pi}{12}$, $c = 1$, $a = \sqrt{3} - 1$, $b = \frac{\sqrt{6}}{1+\sqrt{3}} = \sqrt{6 - 3\sqrt{3}}$, $F = \frac{1}{4}(3 - \sqrt{3})$;
b) $\alpha = \frac{2\pi}{3}$, $\sin \beta = \frac{\sqrt{21}}{7}$, $\sin \gamma = \frac{\sqrt{21}}{14}$, $c = 1$, $b = 2$, $a = \sqrt{7}$, $F = \frac{\sqrt{3}}{2}$.

Aufgabe 5.4

- a) $x = \pm \frac{\pi}{3} + 2\pi k$, $k \in \mathbb{Z}$;
b) $x = \pm \frac{5\pi}{6} + 2\pi k$, $k \in \mathbb{Z}$.

Aufgabe 5.5 a) $\frac{\pi}{2}$, b) $-\frac{\pi}{4}$, c) $\frac{\pi}{4}$, d) $\frac{\pi}{14}$, e) $-\frac{\pi}{6}$.

Aufgaben des Extrablattes

Aufgabe 5.1

- a) $\sin \alpha = \frac{3}{4}$, $\cos \alpha = \frac{\sqrt{7}}{4}$, $\tan \alpha = \frac{3\sqrt{7}}{7}$; d) $\sin \alpha = \frac{\sqrt{5}}{3}$, $\cos \alpha = \frac{2}{3}$, $\tan \alpha = \frac{\sqrt{5}}{2}$;
b) $\sin \alpha = \frac{\sqrt{35}}{6}$, $\cos \alpha = \frac{1}{6}$, $\tan \alpha = \sqrt{35}$; e) $\sin \alpha = \frac{\sqrt{7}}{3}$, $\cos \alpha = \frac{\sqrt{2}}{3}$, $\tan \alpha = \frac{\sqrt{14}}{2}$;
c) $\sin \alpha = \frac{1}{8}$, $\cos \alpha = \frac{3\sqrt{7}}{8}$, $\tan \alpha = \frac{\sqrt{7}}{21}$; f) $\sin \alpha = \frac{\sqrt{10}}{4}$, $\cos \alpha = \frac{\sqrt{6}}{4}$, $\tan \alpha = \frac{\sqrt{15}}{3}$.

Aufgabe 5.2

- a) $a = b = c = \sqrt{2}$, $\alpha = \beta = \gamma = \frac{\pi}{3}$, $F = \frac{\sqrt{3}}{2}$;
b) ?
c) $a = 5$, $b = 12$, $c = 13$, $\gamma = \frac{\pi}{2}$, $\sin \alpha = \frac{5}{13}$, $\sin \beta = \frac{12}{13}$, $F = 30$;
f#) $\gamma = \frac{\pi}{2}$, $\alpha = \alpha$, $\beta = \frac{\pi}{2} - \alpha$, $a = 11$, $b = \frac{11}{\sin \alpha}$, $c = \frac{11}{\tan \alpha}$, $F = \frac{121}{2 \tan \alpha}$.

Aufgabe 5.3

- a) $x = -\frac{\pi}{3} + \pi k$, $k \in \mathbb{Z}$;
b) $x = \pm \frac{\pi}{2} + 2\pi k$, $k \in \mathbb{Z}$.

Aufgabe 5.4 a) $\frac{\pi}{3}$, b) $\frac{5\pi}{6}$, c) $\frac{2\pi}{3}$, d) $\frac{5\pi}{4}$, e) $-\frac{\pi}{10}$, f) $-\frac{\pi}{5}$.