Do., 15.04.2021

zu 145/3) $\cos(\alpha) = \frac{1}{3}$

$\sin(90° - \alpha) = \cos(\alpha) = \frac{1}{3}$

$\sin(\alpha) = ?$

$$\underbrace{(\sin(\alpha))}_{x}^2 + \underbrace{(\cos(\alpha))}_{\frac{1}{3}}^2 = 1$$

$$x^2 + \left(\frac{1}{3}\right)^2 = 1$$

$$x^2 = \frac{8}{9}$$

$$|x| = \sqrt{\frac{8}{9}} = \frac{2\sqrt{2}}{3} = \frac{2}{3}\sqrt{2}$$

$$|\sin(\alpha)| = \frac{2}{3}\sqrt{2}$$

Da $\sin(\alpha) \geq 0$ *) ist, können die Betragsstriche wegfallen.

*) wenn $0 \leq \alpha \leq 90°$

$$\Rightarrow \sin(\alpha) = \frac{2}{3}\sqrt{2}$$

$$\tan(\alpha) = \frac{\sin(\alpha)}{\cos(\alpha)} = \frac{\frac{2}{3}\sqrt{2}}{\frac{1}{3}} = 2\sqrt{2}$$

Rest: siehe Mitschrift vom 14. April

145/4a) $\sin(\alpha) \rightarrow \cos(\alpha)$?

$$(\sin(\alpha))^2 + (\cos(\alpha))^2 = 1 \quad | -(\sin(\alpha))^2$$

$$(\cos(\alpha))^2 = 1 - (\sin(\alpha))^2$$

$$|\cos(\alpha)| = \sqrt{1-(\sin(\alpha))^2}$$

$$\Rightarrow \cos(\alpha) = +\sqrt{1-(\sin(\alpha))^2}$$

oder $\cos(\alpha) = -\sqrt{1-(\sin(\alpha))^2}$

Da für $0 \leq \alpha \leq 90°$

$\cos(\alpha) \geq 0$ ist, kann der

2. Fall nicht auftreten

$$\Rightarrow \cos(\alpha) = \sqrt{1-(\sin(\alpha))^2}$$

$$\tan(\alpha) = \frac{\sin(\alpha)}{\cos(\alpha)}$$

$$= \frac{\sin(\alpha)}{\sqrt{1-(\sin(\alpha))^2}}$$

b) $\sin(\alpha) = \frac{2}{3}$

$$\cos(\alpha) = \sqrt{1-(\sin(\alpha))^2}$$

$$= \sqrt{1-\left(\frac{2}{3}\right)^2}$$

$$= \sqrt{\frac{5}{9}} = \frac{\sqrt{5}}{3} = \frac{1}{3}\sqrt{5}$$

$$\tan(\alpha) = \frac{\sin(\alpha)}{\cos(\alpha)} = \frac{\frac{2}{3}}{\frac{1}{3}\sqrt{5}} = \frac{2 \cdot \sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} = \frac{2\sqrt{5}}{5}$$

$$= \frac{2}{5}\sqrt{5}$$

145/8a) $\tan(\alpha) \cdot \cos(\alpha) =$

$$= \frac{\sin(\alpha)}{\cos(\alpha)} \cdot \cos(\alpha) = \sin(\alpha)$$