

$$\begin{aligned}\cos \alpha = \frac{1}{\sqrt{10}} &\Leftrightarrow \cos^2 \alpha = \frac{1}{10} \Rightarrow \sin^2 \alpha = 1 - \frac{1}{10} = \frac{9}{10} \Rightarrow \sin \alpha = \sqrt{\frac{9}{10}} = \frac{3}{\sqrt{10}} \Rightarrow \\ &\Rightarrow \operatorname{tg} \alpha = \frac{\sin \alpha}{\cos \alpha} = \frac{3}{\sqrt{10}} : \frac{1}{\sqrt{10}} = \frac{3}{\sqrt{10}} \cdot \sqrt{10} = 3\end{aligned}$$