1. Let $\mathbb{A} \in \mathbb{R}^{3\times3}$ a $\mathbb{B} \in \mathbb{R}^{3\times3}$ be invertible matrices. Show that

$$\det(\mathbb{A}+\mathbb{B}) = \det\mathbb{A} + \mathrm{Tr}\left(\mathbb{A}^{\mathsf{T}}\,\mathrm{cof}\,\mathbb{B}\right) + \mathrm{Tr}\left(\mathbb{B}^{\mathsf{T}}\,\mathrm{cof}\,\mathbb{A}\right) + \det\mathbb{B},$$

where $\mathrm{cof}\,\mathbb{C} =_{\mathrm{def}} (\det\mathbb{C})\,\mathbb{C}^{-\mathsf{T}}$ denotes the cofactor matrix of matrix $\mathbb{C}$.