

Due: 09/05/2024**Collaborators: Gianluca Crescenzo, Noah Smith, Carly Venenciano****Problem 1****Problem.** Define

$$\mathfrak{sl}_n(\mathbb{Q}) = \left\{ X = (x_{i,j}) \in \text{Mat}_n(\mathbb{Q}) \mid \text{Tr}(X) = \sum_{i=1}^n x_{i,i} = 0 \right\}.$$

Show that $\mathfrak{sl}_n(\mathbb{Q})$ is a \mathbb{Q} -vector space.