1. If $\begin{bmatrix} a & 1 & 0 \\ 1 & 4 & 1 \\ 0 & 1 & 4 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ b & 1 & 0 \\ 0 & b & 1 \end{bmatrix} \begin{bmatrix} a & 1 & 0 \\ 0 & a & 1 \\ 0 & 0 & a \end{bmatrix}$ and $a > 1,$ find (a, b).

2. Compute $\begin{bmatrix} 1 & 0 & 0 & -3 \\ 0 & 1 & 3 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}^{2021}$.

3. Suppose that $A = \begin{bmatrix} 1 & 2 & \cdots & 10 \\ 11 & 12 & \cdots & 20 \\ \vdots & \vdots & \ddots & \vdots \\ 91 & 92 & \cdots & 100 \end{bmatrix}$. Find $tr(A)$.

4. Compute A^8 where $A = \begin{bmatrix} 1 & -3 \\ 1 & 1 \end{bmatrix}$.

5. Compute A^{-3} where $A = \begin{bmatrix} 1 & -2 \\ 1 & 3 \end{bmatrix}$.