Recall that we saw last Friday that the matrix

$$A = \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$$

has no left inverse.

1. True or False?

The matrix A has infinitely many right inverses.

2. True or False?

The following two matrices are similar.

$$\begin{pmatrix} 2 & 0 \\ 0 & 1 \end{pmatrix} \quad \begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix}$$

3. True or False?

The following two matrices are similar.

$$\begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix} \quad \begin{pmatrix} 2 & 1 \\ 0 & 2 \end{pmatrix}$$

4. True or False?

Let $h : \mathbb{R}^2 \to \mathbb{R}^2$ be reflection across the line $y = x$. Then there exists a basis B of $\mathbb{R}^2$ such that $\text{Rep}_{B,B}(h)$ is a diagonal matrix.