

1. True or False?

The following matrix is diagonalizable.

$$\begin{pmatrix} 2 & -1 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 2 \end{pmatrix}$$

2. True or False?

The following matrix is diagonalizable.

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

3. True or False?

The following matrix is diagonalizable.

$$\begin{pmatrix} -1 & 1 \\ 0 & 1 \end{pmatrix}$$

4. True or False?

Every diagonalizable matrix is nonsingular.

5. True or False?

Every nonsingular matrix is diagonalizable.

6. True or False?

Any  $2 \times 2$  matrix with characteristic polynomial  $p(x) = (x - 1)(x - 2)$  is similar to the following matrix.

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

7. True or False?

If two  $2 \times 2$  matrices have the same characteristic polynomial, they must be similar.