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elemento

1.

The determinant of $\begin{pmatrix} 0 & 0 & 0 & 3 & 0 \\ 0 & 5 & 0 & 0 & 3 \\ 0 & 0 & -1 & 5 & 1 \\ 1 & 0 & 5 & -4 & 0 \\ 0 & 0 & 3 & -2 & -1 \end{pmatrix}$ is equal to

1 / 1 punto

☐ -30

☐ -25

☐ 25

☒ 30

✓ Correcto

2.

The determinant of $\begin{pmatrix} a & b & 0 & 0 \\ 0 & c & 0 & 0 \\ 0 & e & f & g \\ 0 & 0 & h & 0 \end{pmatrix}$ is equal to

1 / 1 punto

☐ $acgh$

☒ $-acgh$

☐ $-acfh$

☐ $acfh$

✓ Correcto

3. Assume A and B are invertible n -by- n matrices. Which of the following identities is false?

1 / 1 punto

☐ $\det A^T = \det A$

☐ $\det A^{-1} = 1/\det A$

☒ $\det 2A = 2 \det A$

☐ $\det (AB) = \det (BA)$

✓ Correcto

4. Which of the following are the eigenvalues of $\begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix}$?

1 / 1 punto

☐ -1, -3

☐ -1, 3

☐ 1, -3

☒ 1, 3

 Correcto

5. Which of the following are the eigenvalues of $\begin{pmatrix} 2 & 1 \\ -1 & 2 \end{pmatrix}$?

1 / 1 punto

☐ $1 \pm 2i$

☐ $1 \pm \sqrt{2}i$

☒ $2 \pm i$

☐ $\sqrt{2} \pm i$

 Correcto

6. Which of the following is NOT an eigenvector of $\begin{pmatrix} 1 & 2 & 0 \\ 2 & 1 & 2 \\ 0 & 2 & 1 \end{pmatrix}$?

1 / 1 punto

☒ $\begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}$

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

☐ $\begin{pmatrix} 1 \\ \sqrt{2} \\ 1 \end{pmatrix}$

☐ $\begin{pmatrix} 1 \\ -\sqrt{2} \\ 1 \end{pmatrix}$

 Correcto

7. Let λ_1, λ_2 and λ_3 be distinct real eigenvalues of a three-by-three matrix A . Which of the following cannot be the associated eigenvectors?

1 / 1 punto

- ☐ $x_1 = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}, x_2 = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}, x_3 = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$
- ☐ $x_1 = \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}, x_2 = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}, x_3 = \begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix}$
- ☒ $x_1 = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}, x_2 = \begin{pmatrix} 1 \\ \sqrt{2} \\ 1 \end{pmatrix}, x_3 = \begin{pmatrix} 1 \\ -\sqrt{2} \\ 1 \end{pmatrix}$
- ☐ $x_1 = \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}, x_2 = \begin{pmatrix} 1 \\ \sqrt{2} \\ 1 \end{pmatrix}, x_3 = \begin{pmatrix} 1 \\ -\sqrt{2} \\ 1 \end{pmatrix}$

☒ Correcto

8. Let A be an n -by- n matrix with distinct real eigenvalues, let S be the matrix whose columns are the eigenvectors of A , and let Λ be the diagonal matrix with eigenvalues down the diagonal. Which of the following identities is false?

1 / 1 punto

- ☒ $A = S^{-1}\Lambda S$
- ☐ $A = SAS^{-1}$
- ☐ $\Lambda = S^{-1}AS$
- ☐ $AS = SA$

☒ Correcto

9. Identify the diagonalization of $\begin{pmatrix} -3 & 4 \\ 4 & 3 \end{pmatrix}$.

1 / 1 punto

☐ $\begin{pmatrix} -3 & 0 \\ 0 & 4 \end{pmatrix} = \frac{1}{4} \begin{pmatrix} -3 & 1 \\ 1 & 3 \end{pmatrix} \begin{pmatrix} -3 & 4 \\ 4 & 3 \end{pmatrix} \begin{pmatrix} -3 & 1 \\ 1 & 3 \end{pmatrix}$

☐ $\begin{pmatrix} -3 & 0 \\ 0 & 4 \end{pmatrix} = \frac{1}{4} \begin{pmatrix} 3 & 1 \\ 1 & -3 \end{pmatrix} \begin{pmatrix} -3 & 4 \\ 4 & 3 \end{pmatrix} \begin{pmatrix} 3 & 1 \\ 1 & -3 \end{pmatrix}$

☒ $\begin{pmatrix} -5 & 0 \\ 0 & 5 \end{pmatrix} = \frac{1}{5} \begin{pmatrix} -2 & 1 \\ 1 & 2 \end{pmatrix} \begin{pmatrix} -3 & 4 \\ 4 & 3 \end{pmatrix} \begin{pmatrix} -2 & 1 \\ 1 & 2 \end{pmatrix}$

☐ $\begin{pmatrix} -5 & 0 \\ 0 & 5 \end{pmatrix} = \frac{1}{5} \begin{pmatrix} 2 & 1 \\ 1 & -2 \end{pmatrix} \begin{pmatrix} -3 & 4 \\ 4 & 3 \end{pmatrix} \begin{pmatrix} 2 & 1 \\ 1 & -2 \end{pmatrix}$

✓ Correcto

10. The matrix $\begin{pmatrix} -3 & 4 \\ 4 & 3 \end{pmatrix}^{10}$ is equal to

1 / 1 punto

☐ $\begin{pmatrix} 5^9 & 0 \\ 0 & 5^9 \end{pmatrix}$

☐ $\begin{pmatrix} -3 \cdot 5^9 & 4 \cdot 5^9 \\ 4 \cdot 5^9 & 3 \cdot 5^9 \end{pmatrix}$

☒ $\begin{pmatrix} 5^{10} & 0 \\ 0 & 5^{10} \end{pmatrix}$

☐ $\begin{pmatrix} -3 \cdot 5^{10} & 4 \cdot 5^{10} \\ 4 \cdot 5^{10} & 3 \cdot 5^{10} \end{pmatrix}$

✓ Correcto