

Test

① What is the determinant of the matrix A , where $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 2 & 1 & 4 \end{bmatrix}$?

② Let $A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & 1 \\ 1 & 2 & 1 \end{bmatrix}$

(a) Find the rank of A .

(b) Find the nullspace of A .

(c) Find the dimension of the nullspace of A .

(d) Find the Column space of A .

③ Let $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, $B = \begin{bmatrix} (2a+b) & b \\ (2c+d) & d \end{bmatrix}$

Find $\det(B)$ if $\det(A) = 5$.

④ Find the Trace of $A^T + B$ if

$\text{trace}(A) = 3$, $\text{trace}(B) = 4$.

⑤ Let A be the matrix
$$\begin{bmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 1 & 5 \end{bmatrix}$$
. Let $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$

be the linear transformation given by multiplication by A . That is, $T(\vec{x}) = A\vec{x}$.

Then, if X is some region in \mathbb{R}^3 with Volume 75, What is the Volume of $T(X)$?

⑥ (a) Find a basis for the Nullspace of

$$A = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 2 & 3 \\ 1 & 1 & 2 \end{bmatrix}$$

(b) Find a basis for the Column Space of A .