

Quiz 8

Wednesday, November 12, 2025

MATH 231
Fall 2025

Problem 1. Let $A = \begin{bmatrix} 2 & -2 & 3 \\ 3 & 1 & 2 \\ 1 & 3 & -1 \end{bmatrix}$

(a) Compute the determinant of A .

$$\begin{aligned} \begin{vmatrix} 2 & -2 & 3 \\ 3 & 1 & 2 \\ 1 & 3 & -1 \end{vmatrix} &= 2 \begin{vmatrix} 1 & 2 \\ 3 & -1 \end{vmatrix} - (-2) \begin{vmatrix} 3 & 2 \\ 1 & -1 \end{vmatrix} + 3 \begin{vmatrix} 3 & 1 \\ 1 & 3 \end{vmatrix} \\ &= -14 - 10 + 24 \\ &= 0 \end{aligned}$$

(b) Is A invertible?

No, as $\det(A) = 0$.

Problem 2. Let A and B be 3×3 matrices, with $\det(A) = -2$ and $\det(B) = 3$. Use properties of determinants to compute:

(a) $\det(AB)$

$$\det(AB) = \det(A) \det(B) = (-2)(3) = -6$$

(b) $\det(5A)$

$$\det(5A) = 5^3 \det(A) = -250$$

(c) $\det(B^{-1})$

$$\det(B^{-1}) = \frac{1}{\det(B)} = \frac{1}{3}$$

(d) $\det(A^3)$

$$\det(A^3) = (\det(A))^3 = (-2)^3 = -8$$