

Name: _____

Date: _____

Show your work very clearly, neatly, and box your final answer.

One Side Only

Properties of Determinant:

1. $|AB| = |A||B|$

2. $|cA| = c^n |A|$

3. $|A^{-1}| = \frac{1}{|A|}, |A| \neq 0$

4. $|A| = |A^T|$

Given: Let A and B be square matrices of order 4 such that $|A| = 4$ and $|B| = -2$, Find

1. $|AB|$

2. $|B^3|$

3. $|3A|$

4. $|A^T|$

5. $|(2A)^{-1}|$

6. $|(AB)^{-1}|$

7. $|B^{-1}|$

8. $|BB^{-1}|$

9. Evaluate $\begin{vmatrix} x & 0 & b \\ -1 & x & m \\ 0 & -1 & 0 \end{vmatrix}$

10. Evaluate $\begin{vmatrix} x & 0 & c \\ -1 & x & b \\ 0 & -1 & a \end{vmatrix}$

11. Find a matrix of order 4×4 such that the value of its determinant is $ax^3 - bx^2 + cx - d$. See the patterns in problem 9 and 10.

12. If \mathbf{A} is an idempotent matrix, then prove that the determinant of \mathbf{A} is either 0 or 1.

13. Evaluate $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix}$, write your answer in factored form.

14. Given: $\mathbf{A} = \begin{bmatrix} 1 & 2 & 1 \\ -1 & -1 & 0 \\ 1 & 2 & -2 \end{bmatrix}$, find λ such that $|\lambda\mathbf{I} - \mathbf{A}| = 0$.