

Name: _____

Math 260

Start Time: _____

Quiz 6 (30 min)

End Time: _____

Date: _____

1. (1 point) Write out the cofactor expansion for the determinant below. Do not calculate any determinants.

$$\begin{vmatrix} 5 & 3 & -2 & 4 \\ 1 & -4 & 2 & -2 \\ 2 & -5 & 1 & 6 \\ 8 & 7 & -1 & -5 \end{vmatrix}$$

2. (2 points) After the sequence of row operations indicated below, matrix A is transformed into matrix D . If

$$D = \begin{bmatrix} -6 & 13 & 0 \\ 0 & 2 & 29 \\ 0 & 0 & 5 \end{bmatrix}, \text{ find } \det(A).$$

$$A \xrightarrow{-3R_1 + R_2 \rightarrow R_2} B \xrightarrow{R_2 \leftrightarrow R_3} C \xrightarrow{4R_2 \rightarrow R_2} D$$

3. (2 points) If A and B are $n \times n$ matrices with $\det(A) = 3$ and $\det(B) = -2$, find $\det(B^{-1}A^2A^TB^TA^{-1}B^2)$.

4. (1, 3, 1 points) If $A = \begin{bmatrix} 1 & -3 & 2 \\ 2 & 4 & 0 \\ 5 & 0 & -1 \end{bmatrix}$, find

a) $\det(A)$

b) $\text{adj}(A)$

c) Use your answers from parts a and b to find A^{-1}

Extra Credit

1. (3 points) Prove: If A is an invertible $n \times n$ matrix and $A^2 = A$, then $\det(A) = 1$.

2. (3 points) Using the formula $\det(AB) = \det(A) \det(B)$, prove the following statement:

If A and B are invertible $n \times n$ matrices, then AB is also an invertible matrix.