WORKSHEET 11/1/23
MATH 2331, FALL 2023

(1) Calculate the determinants of the matrices $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $\begin{bmatrix} 1 & -1 \\ 2 & -3 \end{bmatrix}$, and $\begin{bmatrix} 5 & -7 \\ 11 & -15 \end{bmatrix}$. What do you notice?

(2) Let A and B be $n \times n$ matrices. If A is not invertible, what can you say about AB?

(3) Compare the determinants of the matrices $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $\frac{1}{2} \begin{bmatrix} -4 & 2 \\ 3 & -1 \end{bmatrix}$. What do you notice?

(4) Calculate $\det(A^{-1})$ in terms of $\det(A)$.

(5) Suppose that A and B are similar $n \times n$ matrices. What can you say about $\det(A)$ and $\det(B)$?

(6) Use Laplace expansion across the fourth row to calculate the determinant of the matrix
$$A = \begin{bmatrix} 1 & 0 & 1 & 2 \\ 9 & 1 & 3 & 0 \\ 9 & 2 & 2 & 0 \\ 5 & 0 & 0 & 3 \end{bmatrix}.$$