Math 54 Sp2020 - 3/10/20

Determinants **Name:**

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(1) Compute the determinant of the following matrices.

(a) $\begin{bmatrix} 1 & -2 \\ 0 & 6 \end{bmatrix}$

(b) $\begin{bmatrix} 2 & -3 \\ 1 & 5 \end{bmatrix}$

(c) $\begin{bmatrix} 0 & 1 & -1 \\ 2 & 0 & 1 \\ -1 & 3 & 1 \end{bmatrix}$

(d) $\begin{bmatrix} 1 & 3 & 10 & -2 \\ 0 & 1 & 4 & -1 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

(e) $\begin{bmatrix} 1 & 0 & 1 & -4 \\ 0 & 2 & 4 & 0 \\ 0 & 0 & 1 & -1 \\ -1 & 3 & 0 & 2 \end{bmatrix}$

(2) Determine whether the following statements are true or false. If false, give a counter example. If true, prove why.

(a) Let A be an $n \times n$ matrix. If the columns of A are linearly dependent, then $\det A = 0$.

(b) Suppose A is an upper triangular $n \times n$ matrix, then A is invertible.

(c) Let A be an $n \times n$ matrix, then $\det A = -\det(-A)$.

(d) Let A and B be $n \times n$ matrices. If AB is invertible then both B and A are invertible.

(3) Show that if A is invertible, then $\det(A^{-1}) = \dfrac{1}{\det A}$.

(4) Find a formula for $\det(rA)$ in terms of r and $\det A$, where r is a constnant and A is an $n \times n$ matrix