MATH 341, SELF QUIZ 2

Mark each statement True or False. Justify each answer. Assume that all matrices here are square.

a. If A is a 2×2 matrix with a zero determinant, then one column of A is a multiple of the other.

b. If two rows of a 3×3 matrix A are the same, then $\det A = 0$.

c. If A is a 3×3 matrix, then $\det 5A = 5 \det A$.

d. If A and B are $n \times n$ matrices, with $\det A = 2$ and $\det B = 3$, then $\det(A + B) = 5$.

e. If A is $n \times n$ and $\det A = 2$, then $\det A^3 = 6$.

f. If B is produced by interchanging two rows of A, then $\det B = \det A$.

g. If B is produced by multiplying row 3 of A by 5, then $\det B = 5 \cdot \det A$.

h. If B is formed by adding to one row of A a linear combination of the other rows, then $\det B = \det A$.

i. $\det A^T = -\det A$.

j. $\det(-A) = -\det A$.

k. $\det A^T A \geq 0$.

l. Any system of n linear equations in n variables can be solved by Cramer's rule.

m. If $\mathbf{u}$ and $\mathbf{v}$ are in $\mathbb{R}^2$ and $\det [\,\mathbf{u} \quad \mathbf{v}\,] = 10$, then the area of the triangle in the plane with vertices at $\mathbf{0}$, $\mathbf{u}$, and $\mathbf{v}$ is 10.

n. If $A^3 = 0$, then $\det A = 0$.

o. If A is invertible, then $\det A^{-1} = \det A$.

p. If A is invertible, then $(\det A)(\det A^{-1}) = 1$.