Math 304 Section 5 — Quiz 10 – March 13

Name:_____

1. Fill in the blanks in the following statments of properties of the determinant. Throughout, you may assume that A, B are $n \times n$ matrices of real numbers.

(a) If A is the identity matrix, the determinant of A is _____.

(b) The determinant _____ when two rows are exchanged.

(c) The determinant is a _____ function of each row separately.

(d) If two rows of A are equal, then $\det A$ is _____.

(e) If B is obtained by subtracting a multiple of one row of A from another row of A, then $\det B =$ _____.

(f) If A is a matrix with a row of zeroes, then $\det A =$ _____.

(g) If A is a triangular matrix, then $\det A =$ _____.

(h) If A is invertible, then _____.

(i) $\det(AB) =$_____.

(j) $\det(A^T) =$_____.

2. Suppose A is a 3×3 matrix and $\det A = 5$. Find

(a) $\det(2A)$

(b) $\det(-A)$

(c) $\det(A^2)$

3. Suppose that A, B are $n \times n$ matrices and $AB = -BA$. Consider the following argument that one of A, B does not have an inverse: taking determinants in the given equation, $|A||B| = -|B||A|$, so $|A||B| = 0$. Therefore at least one of $|A|, |B|$ is zero, and so at least one of A, B does not have an inverse.

What, if anything, is wrong with this argument?