Math 54: Worksheet #7

Name: _____   Date: <u>September 23, 2021</u>

<u>Fall 2021</u>

Problem 1 (True/False)**.** The determinant of an $n \times n$ matrix A can only be computed by cofactor expansion across the first row.

Problem 2 (True/False)**.** If A and B are $n \times n$ matrices, then $\det(AB) = \det(A)\det(B)$.

Problem 3 (True/False)**.** If A is $n \times n$, then $\det(cA) = c\det(A)$ for any c in $\mathbb{R}$.

Problem 4 (True/False)**.** If three row interchanges are made in succession, then the new determinant equals the old determinant.

Problem 5 (True/False)**.** If $\det(A) = 0$, then two rows or two columns are the same, or a row or a column is zero.

Problem 6 (3.1 #10). Compute the following determinant by cofactor expansion:

$$\det \begin{pmatrix} \begin{bmatrix} 1 & -2 & 5 & 2 \\ 0 & 0 & 3 & 0 \\ 2 & -4 & -3 & 5 \\ 2 & 0 & 3 & 5 \end{bmatrix} \end{pmatrix}$$

Problem 7 (3.2 #8). Find the determinant of the following matrix by row-reduction to echelon form:

$$\begin{bmatrix} 1 & 3 & 2 & -4 \\ 0 & 1 & 2 & -5 \\ 2 & 7 & 6 & -3 \\ -3 & -10 & -7 & 2 \end{bmatrix}$$

Problem 8 (3.3 #8)**.** Determine the values of the parameter s for which the following system has a unique solution, and describe the solution:

$$3sx_1 + 5x_2 = 3$$
$$12x_1 + 5sx_2 = 2$$