1. (5 pts.) Suppose that A and B are 4 x 4 matrices with det(A) = -2 and det(b) = 3. Using appropriate properties of the determinant, compute each of the following.

(a) $\det(AB)$ =

(b) $\det(A^{-1})$ =

(c) $\det(B^{T})$ =

(d) $\det(A^{5})$ =

(e) $\det(5A)$ =

2. (5 pts.) For what value(s) of the parameter s does the following system have a unique solution, and what is the unique solution in terms of s? (For the first part, after you figure out what is going on, using a complete sentence, write your answer so that there is no ambiguity concerning your intentions.)

$$2s\cdot x_1 + 3s\cdot x_2 = -1$$

$$4\cdot x_1 + 3s\cdot x_2 = 1$$

3. (6 pts.) **Jeopardy!** Suppose that the answer to A**x** = **b** is **x** with

$$x_2 = \frac{\begin{vmatrix} 3 & 15 & 0 \\ -4 & -8 & 0 \\ 3 & 25 & 5 \end{vmatrix}}{\begin{vmatrix} 3 & 0 & 0 \\ -4 & -4 & 0 \\ 3 & -5 & 5 \end{vmatrix}}.$$

(a) What are A and **b**?

(b) Compute adj(A).

(c) Using your results from part (b), not row reduction, compute $A^{-1}$.

$A^{-1}$ =

4. (2 pts.) Write the recursive definition of the determinant function.

5. (2 pts.) Suppose the standard matrix for the linear transformation $T:\mathbb{R}^2 \to \mathbb{R}^2$ is the matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$.

If S is a circular region with radius $r = \pi$, what is the area of the region T(S) ??

Area(T(S)) =