Math 270 HW#13

Name:_____ Date:_____

Show your work very clearly, neatly, and box your final answer.

One Side Only

Given: $A = \begin{bmatrix} 1 & 6 & 3 \\ -2 & 7 & 1 \\ 3 & -1 & 4 \end{bmatrix}$**, Find**

1. $\text{adj}(A)$

2. $\det(A)$

3. A^{-1} by using the adjoint and the determinant of A**.**

4. Prove that if A is invertible, then $\text{adj}(A)$ is invertible and

$$\big(\text{adj}(A)\big)^{-1} = \frac{1}{\det(A)} A = \text{adj}(A^{-1})$$

5. Prove if A is an $n \times n$ matrix, then $\det(\text{adj}(A)) = (\det(A))^{n-1}$

6. Show that if a square matrix A satisfies $A^3 + 4A^2 - 2A + 7I = \mathbf{0}$ then so does A^T.

Determine which sets below are vector spaces under given operations. For those that are not, list all the axioms that fail to hold.

7. The set of all real numbers x with standard operations of additions and multiplications.

8. The set of all positive real numbers x with operations $x_1 + x_2 = x_1 x_2 \;\&\; kx = x^k$.

9. Let $\mathbf{W}$ be the set of all 2×2 matrices of the form $\begin{bmatrix} a & a-b \\ a+b & b \end{bmatrix}$ with matrix addition and scalar multiplication. Show $\mathbf{W}$ is a subspace of vector space $\mathbf{V}$ on $\mathbf{M_{2,2}}$ with matrix addition and scalar multiplication.