

Name: _____

Date: _____

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

One Side Only

1. Let V be the set of positive real numbers, and define operations on V to be $u + v = uv$ & $cu = u^c$. **Box your answer for a-d.**

a) Find $4 + 10$ b) $2(10)$ c) Find the zero vector of V .d) Find the additive inverse of V .e) Verify that $c(u + v) = cu + cv$

2. Prove that if u and v are vectors in \mathbb{R}^n with standard dot product such that $\|u + v\| = \|u - v\|$, then they are orthogonal vectors in \mathbb{R}^n .

3. Given: $A = \begin{bmatrix} 1 & 0 & 1 & 1 \\ 3 & 2 & 5 & 1 \\ 0 & 4 & 4 & -4 \end{bmatrix}$

a) Find a basis for the row space of A . Find the dimension of row space of A .

b) Find a basis for the column space of A . Find the dimension of column space of A .

4. Find a basis for the subspace of \mathbb{R}^4 spanned by the set below.

$$S = \{(2, 5, -3, -2), (-2, -3, 2, 5), (1, 3, -2, 2), (-1, -5, 3, 5)\}$$

5. Find a basis for, and the dimension of, the nullspace of A .

$$A = \begin{bmatrix} 3 & -6 & 21 \\ -2 & 4 & -14 \\ 1 & -2 & 7 \end{bmatrix}$$