

Name: _____ Date: _____

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

One Side Only

Use the Gram-Schmidt orthonormalization process to transform the given basis for R^n into orthonormal basis. Use Maple to verify your answers, and attach your work.

1. $B = \{(4, -3), (3, 2)\}$

2) $B = \{(0, 1, 2), (2, 0, 0), (1, 1, 1)\}$

3. Let \mathbb{R}^3 have the inner product $\langle u, v \rangle = u_1v_1 + 2u_2v_2 + 3u_3v_3$. Use the Gram-Schmidt process to transform $S = \{(1, 1, 1), (1, 1, 0), (1, 0, 0)\}$ into an orthonormal basis.

4. 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 .

5. 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 solution space of $Ax = 0$.

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