

Assignment 6

(5 questions

x 2 = 10 marks)

1. Is the following set of vectors linearly dependent?
 $(0, 3, -3, -6), (-2, 0, 0, -6), (0, -4, -2, -2), (0, -8, 4, -4)$

2. \vec{v}_1, \vec{v}_2 and \vec{v}_3 are vectors extending from the origin.
Do the three vectors lie in a plane?
 $\vec{v}_1 = (-6, 7, 2) \quad \vec{v}_2 = (3, 2, 4) \quad \vec{v}_3 = (4, -1, 2)$

3. Is the following set of vectors, a basis for \mathbb{R}^3 ?
 $(3, 1, -4), (2, 5, 6), (1, 4, 8)$

4. Find the coordinate vector \vec{v} relative to the basis
 $S = \{ \vec{v}_1, \vec{v}_2, \vec{v}_3 \}$.

$$\vec{v} = (5, -12, 3) \quad \vec{v}_1 = (1, 2, 3) \quad \vec{v}_2 = (-4, 5, 6) \quad \vec{v}_3 = (7, -8, 9)$$

5. Use the Gram-Schmidt process to transform the basis $\{ \vec{u}_1, \vec{u}_2, \vec{u}_3 \}$ into an orthonormal basis:

$$\vec{u}_1 = (1, 0, 0) \quad \vec{u}_2 = (3, 7, -2) \quad \vec{u}_3 = (0, 4, 1)$$