

姓名: _____

葉均承 應數一線性代數

學號: _____

Quiz 14

考試日期: 2024/12/25

不可使用手機、計算器，禁止作弊!

1. Determinant whether the given 4 points lie in a plane in \mathbb{R}^4 . If so, find its area. If not, find its volume.

$$A(1, 0, 0, 1), B(-1, 2, 0, 1), C(3, 0, 1, 1), D(-1, 4, 0, 1)$$

Answer:

☐ $ABCD$ are coplanar(共平面), and the area of the quadrilateral (四邊形) is _____.

☐ $ABCD$ are NOT coplanar, and the volume of the tetrahedron(四面體) is _____.

2. Let G be the tetrahedron determined in previous problem. Let $T : \mathbb{R}^4 \rightarrow \mathbb{R}^5$ be given by $T([x, y, z, w]) = [2x + 3y, x - y, 2y + w, z + w, x - w]$. Find the volume of the image of G in \mathbb{R}^5 under the transformation T .

Answer: _____