Lecture 7: Worksheet

1   Find the matrix to the following linear transformations:

a) $T(x, y, z) = x + y + z$.

b) $T(x) = \begin{bmatrix} x \\ 2x \\ 3x \end{bmatrix}$.

c) $T(x, y) = (y, x)$.

d) $T(x, y, z) = (1, 2, 3) \cdot (x, y, z)$ (dot product)

2   Find the linear transformation which has the property that

$$T(1, 1) = (3, 4), T(1, -1) = (5, 5)$$

3   What does the following transformation do?

$$T(x, y) = (2x + 2y, 2x - 2y)$$

4   Find the linear transformation which rotates a cube around the diagonal by 120 degrees.

5   Find the linear transformation which rotates a cube around the z axes by 90 degrees.