Homework 15

$V = \mathbb{Z}_5^2$

$W = \mathbb{R}^3$

Bases

V: $B_V = \{(1,2), (0,1)\}$

W: $B_W = \{(1,0,0), (0,1,0), (0,0,1)\}$

Linear Map Of T

$T: V \to W$

$T(v_1) = 2w_1 + w_3 = \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix}$

$T(v_2) = w_2 - w_3 = \begin{pmatrix} 0 \\ 1 \\ -1 \end{pmatrix}$

$v_1 = (1,2)$ $v_2 = (0,1)$

$$M(T) = \begin{bmatrix} 2 & 0 \\ 0 & 1 \\ 1 & -1 \end{bmatrix}$$

$$v = \begin{bmatrix} 3 \\ 4 \end{bmatrix}$$

$$Tv = \begin{bmatrix} 2 & 0 \\ 0 & 1 \\ 1 & -1 \end{bmatrix} \times \begin{bmatrix} 3 \\ 4 \end{bmatrix} = \begin{bmatrix} 1 \\ 4 \\ -1 \end{bmatrix}$$