

1. (20 pts) Determine whether the given subset W is a subspace of the vector space V .

(a) Let $V = \mathbf{R}^3$ and let $W = \{(x, y, z) \mid z = x + y\}$.

(b) Let V be the vector space M_2 of all 2×2 matrices. Let W be the subset of all matrices $A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$ for which $a_{22} = -a_{11}$ and $a_{21} = -a_{12}$.

(c) Let $V = \mathbf{R}^3$ and let $W = \{(x, y, z) \mid xyz = 0\}$.