

Find a basis for each of the following vector spaces.

1. $V = \{f \in \mathbb{P}_3 \mid f(-1) = f'(-1) = 0\}$

A basis for V is $\{(x+1)^2, (x+1)^3\}$.

2. $W = \{A \in M_3 \mid A^T = -A\}$, where M_3 is the set of all 3×3 matrices

A basis for W is given by the matrices

$$\begin{pmatrix} 0 & 0 & -1 \\ 0 & 0 & 0 \\ 1 & 0 & 0 \end{pmatrix}, \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & 1 & 0 \end{pmatrix}, \begin{pmatrix} 0 & -1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$$