1. Let $V = \{a_0 + a_2x^2 + a_4x^4 + a_6x^6 : a_0, a_2, a_4, a_6 \in \mathbb{R}\}$, the vector space over $\mathbb{R}$ with standard addition and scalar multiplication.

   (a) Show that V is a subspace of $\mathbb{R}[x]$ (the set of polynomials in x with co-efficients in $\mathbb{R}$).

   (b) Find a basis for V. *Justify your answer fully i.e. prove the basis you find is in fact a basis.*

2. Let $W = \{f(x) \in \mathbb{R}[x] : f(x) = \sum_{i=0}^{m} a_{2i}x^{2i}, a_{2i} \in \mathbb{R}, m \in \mathbb{N} \cup \{0\}\}$, the vector space over $\mathbb{R}$ with standard addition and scalar multiplication.

   (a) Is W finite dimensional?

   (b) Find a basis for W.

   In both cases you should justify your answer fully.