1. Suppose that $V, W$ are vectors spaces over the field $F$. Find a basis for $\mathcal{L}(\mathcal{L}(V, W), W)$.

2. Describe the null space and range of each of the following linear maps:
   
   (a) $f : \mathbb{R}^3 \to \mathbb{R}^2$, where $f(x, y, z) = (3x + 2y, x - z)$
   
   (b) $g : \mathcal{P} \to \mathbb{R}$, where $\mathcal{P}$ is the set of all polynomials and
   \[
   g(p) = \int_{-1}^{1} p(x)dx.
   \]

   (c) $h : \mathcal{P}(3) \to \mathbb{R}^2$, where $h(a_0 + a_1x + a_2x^2 + a_3x^3) = (a_1 + a_2, a_3 - a_0)$.

3. Suppose that $W$ is a subspace of $V$ and that $f : V \to U$ is an isomorphism. Show that
   \[
   f(W) = \{ u \in U \mid u = f(w) \text{ for some } w \in W \}
   \]
   is a subspace of $U$. What is the dimension of $f(W)$?