1. Explicitly exhibit a set which is $\Pi^0_5$ and not $\Sigma^0_5$.

2. We have seen that, given a 1-place partial recursive function $\psi$ which is one-to-one, the inverse function $\psi^{-1}$ is again partial recursive. The Uniformity Principle tells us that, given an index of $\psi$, we should expect to be able to compute an index of $\psi^{-1}$.
   
   (a) Give a rigorous statement of this result concerning indices.
   
   (b) Give a full proof of this result, using the Parametrization Theorem.

3. Let $A$ and $B$ be subsets of $\mathbb{N}$. If $A$ and $B$ are simple, prove that $A \cap B$ is simple.

4. Let $A, B, C$ be recursively enumerable subsets of $\mathbb{N}$ such that $A = B \cup C$ and $B \cap C = \emptyset$. Let $a, b, c$ be the respective Turing degrees of $A, B, C$. Prove that $a = \sup(b, c)$.

5. Consider the sets $R = \{e \mid W_e \text{ is recursive}\}$, $C = \{e \mid W_e \text{ is creative}\}$, and $S = \{e \mid W_e \text{ is simple}\}$. What can you say or guess in the way of classifying $R, C$ and $S$ in the arithmetical hierarchy? Prove as much as you can.

6. (a) Let $f_i, i = 0, 1, 2, \ldots$ be a countable sequence of nonrecursive total 1-place functions. Use the method of finite approximation to construct a nonrecursive total 1-place function $g$ such that $f_i \not\leq_T g$ for all $i$.

   (b) Deduce that for any Turing degree $a > 0$ we can find a Turing degree $b > 0$ such that $\inf(a, b) = 0$. 