1. Let $S$ be a language with a unary function symbol $+$, a binary function symbol $1$, and a 17-ary relation symbol $\prec$. Give an example of an $S$-structure with an infinite universe.

2. Let $S$ be the language of rings: two binary function symbols $+$ and $\cdot$, a unary function symbol $-$, and two constant symbols $0$ and $1$. How many $S$-structures with universe $\{1, 2, a, X\}$ are there?

3. Let $S$ be a language, $x$ a variable, and $\tau$ an $S$-term. Prove or refute the following.

   (a) If $t$ is another $S$-term, and $t'$ is the expression obtained by replacing every instance of $x$ in $t$ with $\tau$, then $t'$ is also an $S$-term.

   (b) If $\alpha$ is an $S$-formula, and $\beta$ is the expression obtained by replacing every instance of $x$ in $\alpha$ with $\tau$, then $\beta$ is also an $S$-formula.

4. Do exercises 2.1.1, 2.1.7, and 2.1.10 in Enderton

5. Do exercises 2.2.9 and 2.2.11 in Enderton