I220, Autumn 2002: Exercise 9

1. From the book: 9.3-1.

2. From the book: 9.4-1.

3. From the book: 9.5-1.

4. Let $\Sigma \subseteq \Sigma'$ be two signatures, $A \in \mathsf{Alg}(\Sigma)$ be generated, and (A', q) be a free extension of A for $\mathsf{Alg}(\Sigma')$. Let $\mathsf{K}' \subseteq \mathsf{Alg}(\Sigma')$ be the class of all extensions of A, i.e. $\mathsf{K}' = \{B' \in \mathsf{Alg}(\Sigma') : B'|_\Sigma \simeq A\}$.

    (a) Show that A' is initial for K'

    (b) Find conditions under which an algebra $A' \in \mathsf{Alg}(\Sigma')$ is initial in K'