This exercise sheet studies language learning.

**Exercise 1** (4pts) Let $L$ be a computable language. Show that $\{L \cup D \mid D \text{ finite}\}$ is TxtGEx-learnable.

**Exercise 2** (4pts) Let $L$ be a computably enumerable language. Show that $\{L \cup D \mid D \text{ finite}\}$ is TxtGBc-learnable.

**Exercise 3** (4pts) Let $\mathcal{L} = \{L \neq \emptyset \mid W_{\min}L = L\}$. Show that $\mathcal{L}$ isTxtGEx-learnable; then show that, for each computably enumerable $L$, there is a finite variant $L'$ of $L$ such that $L' \in \mathcal{L}$.

**Exercise 4** (4pts) Let $\mathcal{L} \in \tau(\text{Cons})\text{TxtGEx}$. Show that, for all $L \in \mathcal{L}$, $L$ is decidable (that is, there is an algorithm to decide for any $x$ whether $x \in L$). Hint: For a (consistent) learner $h$ for a language $L$, $h$ has a locking sequence on $L$. 