Problem 1.

(a) Prove that the ordered pair of positive integers is countably infinite.

(b) Show that the family of recursive languages is closed under intersection.

Problem 2. Consider a finite language $L$ (where $|L| \geq 0$) defined over the alphabet $\Sigma = \{a, b\}$.

(a) Show that $L^*$ is a recursively enumerable language.

(b) Describe an enumeration procedure for $L^*$.

(c) Is the language $L^*$ recursive? Prove your answer.