Challenge 7 –Context Free Languages (CFLs) and Context Free Grammars (CFGs)

Consider the language defined by L1 = $\{a^i b^j \mid i \neq j\}$ and the following CFG grammar G:

$S \rightarrow CA \mid AE$

$A \rightarrow aAb \mid \varepsilon$

$C \rightarrow aD$

$D \rightarrow aD \mid \varepsilon$

$E \rightarrow bF$

$F \rightarrow bF \mid \varepsilon$

(a) Is L(G) = L1? If so, prove by induction the following statement: if $w \in L(G)$ then $w \in L1$

(b) Is the prove of the previous statement enough to prove L(G) = L1? Justify your answer.