3. Show that CFLs are closed under union, concatenation, and star:

   CFLs are closed under union as $\forall$ L_1 and $L_2 \in$ a CFL, $L_1 \cup L_2$
   If we take and combine these two languages we can create a new CFG such that
   $S \rightarrow S_1 \mid S_2$
   This will create a string from S_1, S_2, or both S_1 and S_2 which is the definition of union

   CFLs are closed under concatenation as $\forall$ L_1 and $L_2 \in$ a CFL, $\{s_1 s_2 \mid s_1 \in L_1$ and $s_2 \in L_2\}$
   $S \rightarrow S_1\ S_2$
   which will create a string from L_1 and then L_2 which is the definition of concatenation

   CFLs are closed under star as $\forall$ $L \in$ a CFL, $L^* \in$ a CFL:
   $S \rightarrow S_1 S \mid \epsilon$
   This will generate any string from L but also can create no string which is the definition of start.