Ma2201/CS2022 **Foundations of C.S.** Spring, 2021
Quiz 0011

PRINT NAME: _____
$\mathcal{SIGN}$: _____

1. (6 pts) Let $L \subseteq \{a, b, c\}^*$ be the language defined recursively by
BASIS: $\lambda \in L$
RECURSIVE STEP: If $w \in L$ then awb and $w^2 \in L$.
CLOSURE: Every element in L can be generated from the basis after a finite number of applications of the recursive step.

Prove *carefully* by induction that every element in L has even length.

2. (4 pts) Let p_k be statement for $k \in \mathbb{N}$. Suppose that for all k that $p_k \Rightarrow p_{2k}$.
Suppose that p_8 is true and p_{800} is false.
For each of the following, label it T if it *must* be true, F if it *must* be false, and X if it cannot be determined from the given information.

___ p_{1600}.

___ p_{25}.

___ p_{24}.

___ p_{16}.