Consider the grammar \((N, T, P, \sigma)\) given as defined below.

\[
N = \{\langle s \rangle\}
\]

\[
T = \{A, B, C, \ldots, Z, \Lambda, V, !\}
\]

\[
P = \begin{cases}
\langle s \rangle \rightarrow \langle s \rangle \Lambda \langle s \rangle \\
\langle s \rangle \rightarrow \langle s \rangle V \langle s \rangle \\
\langle s \rangle \rightarrow ! \langle s \rangle \\
\langle s \rangle \rightarrow A | B | C | \ldots | Y | Z
\end{cases}
\]

\[
\sigma = \langle s \rangle
\]

1a) How many valid words are in the language this grammar defines?

Infinitely many. For instance it contains:

\[
A
\]

\[
A \Lambda A
\]

\[
A \Lambda A \Lambda A
\]

\[
A \Lambda A \Lambda A \Lambda A
\]

2) Write a grammar that generates the strings over \(\{a, b, c\}\) that end in \(abcba\).

A grammar is \((N, T, P, \sigma)\) where:

\[
N = \{x, y\}
\]

\[
T = \{a, b, c\}
\]

\[
P = \begin{cases}
y \rightarrow xabcba \\
x \rightarrow a | b | c | "" \\
x \rightarrow xa | xb | xc
\end{cases}
\]

\[
\sigma = y
\]

There are many correct answers.

If I wrote a derivation on your paper, it means your grammar has a valid word not ending in \(abcba\).

If I wrote a string with a question mark, it means your grammar is missing that word.