Exercise on Context-Free Languages

1. Consider the following languages, defined over the alphabet $\Sigma = \{a, b\}$:

$$L_1 = \{a^n b a^n b a^m \mid n, m \geq 1, \ m \geq n\}$$
$$L_2 = \{a^n b a^p b a^m \mid n, m, p \geq 1, \ m \geq n\}$$

For each of the above languages, state whether it belongs to the class CFL and provide a mathematical proof of your answer.