Exercise on Regular Languages

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

$$
\begin{aligned}
L_1 &= \{a^p b^n a^q \mid n, p, q \geq 0, \ p + q = n\} \ ; \\
L_2 &= \{a^p a^n a^q \mid n, p, q \geq 0, \ p + q = n\} \ ; \\
L_3 &= \{a^p b^n b^q \mid n, p, q \geq 0, \ p + q = n\} \ .
\end{aligned}
$$

For each of the above languages, state whether it belongs to the class REG.