1. Let $H$ be the subgroup of $F_2 = \langle a, b \rangle$ generated by $b, a^2, ab^2a, ababa$.

   (a) Find the immersion $\Gamma_H \hookrightarrow R$ representing $H$.
   (b) Does $aba^2aba$ belong to $H$? Does $ab^2a$?
   (c) Is $b^2$ conjugate into $H$? Is $a$?
   (d) What is the index of $H$ in $F_2$?

2. Let $H$ be the subgroup of $F_3 = \langle a, b, c \rangle$ generated by $a^2, ab, acb$.

   (a) Find the immersion $\Gamma_H \hookrightarrow R$ representing $H$.
   (b) Does $aca$ belong to $H$? Does $b$?
   (c) Is $b^2$ conjugate into $H$? Is $a$?
   (d) What is the index of $H$ in $F_3$?

3. Let

   \[ f : F_2 = \langle x, y \rangle \rightarrow F_2 = \langle a, b \rangle \]

   be defined by

   \[ x \mapsto abbab, y \mapsto bababbab \]

   Is $f$ an isomorphism?

4. Let $H, K$ be subgroups of $F_2 = \langle a, b \rangle$ as follows:

   \[ H = \langle a, b^2 \rangle \]

   and

   \[ K = \langle ba, ab^3a \rangle \]

   Compute $H \cap K$. 