

Let  $X$  be an arbitrary set, let  $f$  be a one-to-one function mapping  $X$  onto itself. Prove that there exist mappings  $g_1, g_2 : X \rightarrow X$  such that  $f = g_1 \circ g_2$  and  $g_1 \circ g_1 = id = g_2 \circ g_2$ , where  $id$  denotes the identity mapping on  $X$ .