QUIZ 2 Math 145, Abstract Algebra, Duchin

(1) Give an example of a well-defined function from $\mathbb{Z}_3 \to \mathbb{Z}_{10}$ that is neither injective nor surjective. (Or if none exists, say why not.)

(2) Let $S = \{1, 2, 3, 4, 5\}$ and let F be the set of all functions from $S \to S$. Define an equivalence relation by saying that $f \sim g$ if and only if $f(5) = g(5)$.

Consider the function $h : S \to S$ defined by $h(x) = \begin{cases} 4, & x \text{ even} \\ 1, & x \text{ odd.} \end{cases}$

Name a function different from h that is in $[h]$.

EC1: How many such functions exist in #1?

EC2: How many elements does each equivalence class have in #2?