

Name: _____

Lecture 23, class activity. Well-defined, Part I.

Consider the set \mathbb{R} and $f: \mathbb{R} \rightarrow \mathbb{R}$ with $f(x) = x^2$. Define a relation on \mathbb{R} where $x \sim y \iff f(x) = f(y)$. (We showed before that this is an equivalence relation.)

1. Recall that \mathbb{R}/\sim is the set of equivalence classes under \sim ; describe this set, i.e. list all equivalence classes of \sim

2. Now consider the function $g(x) = x$. Define $G: \mathbb{R}/\sim \rightarrow \mathbb{R}$ with $G([x]) := g(x)$. Show that G is well-defined.

3. Now consider the function $h(x) = x^3$. Define $H: \mathbb{R}/\sim \rightarrow \mathbb{R}$ with $H([x]) := h(x)$. Show that H is well-defined.

4. Now consider the function $j(x) = x + 1$. Define $J: \mathbb{R}/\sim \rightarrow \mathbb{R}$ with $J([x]) := j(x)$. Show that J is **not** well-defined.