

# Two rules, same function; two functions, same rule

User 2473 · 6 May 2025

This post is about an interesting observation I made regarding rules and functions. One function can have two distinct rules. For example, consider the rules  $x^3$  and  $x$ . They are different, yet over the set  $\{-1, 0, 1\}$ , they define the same function. And the opposite can also happen. For example, the function  $x^2$  over the reals  $\mathbb{R}$  is different than the function  $x^2$  over the rationals  $\mathbb{Q}$ , but they have the same rule, namely  $x^2$ .

Of course, to make this all precise, we would need a rigorous definition of “rule” that can distinguish it from functions. I invite any readers to try to come up with a rigorous definition of “rule”.