Bijection from [0,1] to R

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Solution:

$$f(x) = \tan(x - \frac{1}{2})\pi$$

$f : [0, 1] \to \mathbb{R}$ is a simple injection.

$$g(x) = \begin{cases} 0 & x = -\infty \\ \dfrac{\arctan(x)}{\pi} + \dfrac{1}{2} & -\infty < x < \infty \\ 1 & x = \infty \end{cases}$$

$g : \mathbb{R} \to [0, 1]$ is a simple injection.

Hence, we find an explicit bijection from [0, 1] to $\mathbb{R}$

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