Exercise 5 solution: Suppose $\pi F(x) = f\pi(x)$ and $\pi G(x) = f\pi(x)$ for all $x \in \mathbf{R}$. Then given a real x, there is an integer k_x such that $F(x) = G(x) + k_x$. The function $d : \mathbf{R} \to \mathbf{Z},\ d(x) = F(x) - G(x)$ is continuous since F and G are both lifts of f. Since $\mathbf{R}$ is connected, $d(\mathbf{R}) \subset \mathbf{Z}$ is connected. The only connected subsets of $\mathbf{Z}$ are singleton sets; therefore $d(\mathbf{R}) = \{k\}$ for some integer k. That is, there is an integer k satisfying $F(x) = G(x) + k$ for all $x \in \mathbf{R}$.