3.147 [093] Let A be a set and let $g : A \to A$ be injective. We define the relation $x \sim y$ which is true when an $n \geq 0$ exists such that $x = g^n(y)$ or $x = g^n(y)$; where

$$g^n = \overbrace{g \circ \cdots \circ g}^{n}$$

is the n-th iterate of the composition. (We decide that g^0 is identity). Show that $x \sim y$ is an equivalence relation. Study equivalence classes. Let $U = \bigcap_{n=1}^{\infty} g^n(A)$ be the intersection of repeated images. Show that each class is entirely contained in U or is external to it.

Solution 1. [094]