Problem 7
Show that the two maps
\[ f_r(x) = rx(1-x), \quad g_a(x) = a - x^2 \]
(considered as maps on \( \mathbb{R} \)) are topologically conjugate via a linear homeomorphism (i.e. via \( h(x) = \alpha x + \beta \) with suitable \( \alpha \) and \( \beta \)) when a relation between the parameters \( r \) and \( a \) is imposed.

Problem 8
Let \( S^1 = \{ z \in \mathbb{C} \mid |z| = 1 \} \) denote the boundary of the unit circle in the complex plane, and let \( |z - z'| \) denote the distance between two points in \( S^1 \). Consider the map \( R_\alpha : S^1 \to S^1 \) defined by (rotation by the angle \( \alpha \))
\[ R_\alpha(z) = \exp(i\alpha)z, \quad (\alpha \in \mathbb{R}). \]
Show that the map \( R_\alpha \) is not topologically transitive when \( \alpha \) is a rational multiple of \( 2\pi \), i.e. \( \alpha = 2\pi p/q, \quad p/q \in \mathbb{Q} \).