5 Problem Set 5 — Topological conjugacy

1. Find a topological conjugacy between the logistic map

$$F_\mu(x) = \mu x(1-x)$$

and the quadratic map

$$Q_c(x) = x^2 + c$$

Hint: try a linear conjugacy ($h(x) = ax + b$) and equate coefficients of x. You will also have to work out how c and μ are related.

2. Find a conjugacy between the tent-map, $T : [0,1] \mapsto [0,1]$:

$$T(x) = \begin{cases} 2x & x \leq 1/2 \\ 2 - 2x & x > 1/2 \end{cases}$$

and $G(x) = 2x^2 - 1$ on the interval $[-1, 1]$. *Hint*: think "angle doubling".

3. Find a conjugacy between $G(x) = 2x^2 - 1$ on $[-1, 1]$ and $Q_{-2}(x) = x^2 - 2$ on $[-2, 2]$. *Hint*: try a linear conjugacy.

4. Find a conjugacy between the "tripling map" on S^1, $F(\theta) = 3\theta$, and $G(x) = 4x^3 - 3x$ on $[-1, 1]$.