# MCMT Homework 13

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## Exercise 13.1

Exercise 12.2.

## Exercise 13.2

Before gluing: $R(a,z) = \inf_\theta E(\theta)$
s.t. $||\theta|| = 1, \sum_y \theta(v_1, y) = 0, \sum_y \theta(v_2, y) = 0$.
After gluing: $R'(a,z) = \inf_\theta E(\theta)$
s.t. $||\theta|| = 1, \sum_y \theta(v_1, y) + \sum_y \theta(v_2, y) = 0$.
They have the same objective function, but $R'(a,z)$ has a relaxed constraint. So $R(a,z) \geq R'(a,z)$.

Assume there is an edge between $v_1$ and $v_2$ with $r = \inf$. After gluing, the resistance is 0, and $\phi(v_1) = \phi(v_2)$, the new resistance is smaller.