

Weekly Problems 8

Due: 15 March 2024 at midnight EST as a PDF on Submittify

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1. Show that for non-adjacent vertices $x, y \in V(G) : \kappa(x, y) = \lambda(x, y)$ by using the concept of network flows. Hint: Consider the following transformation on G : replace each vertex in G with an edge having unit capacity, and give all other edges in G infinite capacity.

2. The US Census Bureau wishes to redraw the metropolitan boundaries between Troy and Albany. To do so, they consider a flow network of highway traffic between source vertex *Albany* to sink vertex *Troy*, where the minimum cut on this network will be the new boundary. To assist the Census Bureau, do the following:
 - (a) First, calculate a maximum flow and use that to determine a minimum *Albany*–*Troy* cut.
 - (b) Next, identify which towns are on each side of the cut. Note that this cut may not be unique.

