Problem 1. Find a Hamiltonian cycle in each of the graphs below.

\[(a)\quad (b)\quad (c)\quad (d)\quad (e)\]

Problem 2. Use Kruskal’s algorithm to find a minimum weight spanning tree in the weighted graph below. Show the intermediate steps of the algorithm. What is the weight of the tree that you found?
Problem 3. How many colors are necessary to color the regions of the map below so that no two regions of the same color share a stretch of their borders? Show a coloring using that many colors and explain why fewer colors are not enough.

Problem 4. Redraw the graphs below so that their edges do not overlap unless they share a vertex.