Work on these with your partner(s) at the board

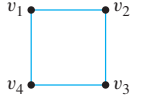
1. Sketch a graph with the given adjacency matrix.

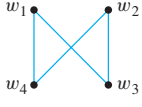
(a) $\begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 0 & 1 & 2 \\ 0 & 0 & 1 & 0 \\ 0 & 2 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix}$

Note (a) is an undirected graph and (b) is directed

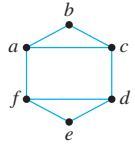
2. For each pair of simple graphs, determine if G and G' are isomorphic. If they are, give the function $g : V(G) \to V(G')$. If not isomorphic, prove why not.

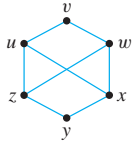
(a)



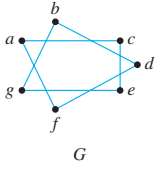


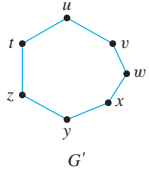
(b)



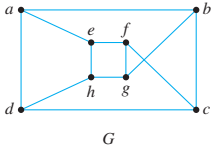


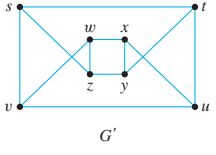
(c)





(d)

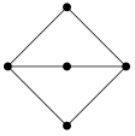


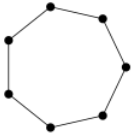


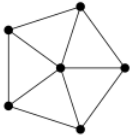
Epp, Section 10.4

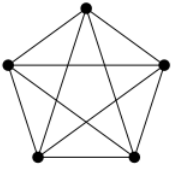
Work on these with your partner(s) at the board

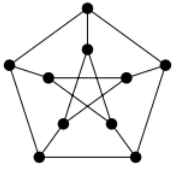
3. For each graph, give a proper coloring and determine its chromatic number







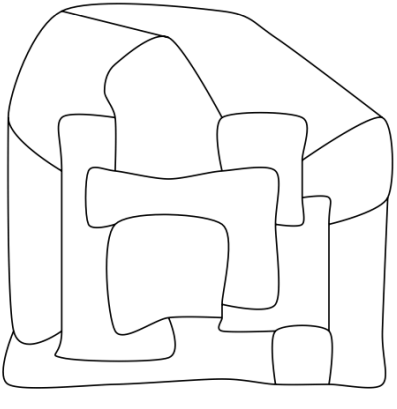




Levin, Section 4.4

4. Show the graphs G and G' from 2(d) are not isomorphic.

4. Mapmakers in the fictional land of Euleria have drawn the borders of the various dukedoms of the land. To make the map pretty, they wish to color each region. Adjacent regions must be colored differently, but it is perfectly fine to color two distant regions with the same color. What is the fewest colors the mapmakers can use and still accomplish this task?



Levin, Section 4.4