

Graph Theory and Combinatorics MATH-42021/52021.
Home Work 1, due on Wednesday, SEPTEMBER 4
Instructor: Prof. Artem Zvavitch

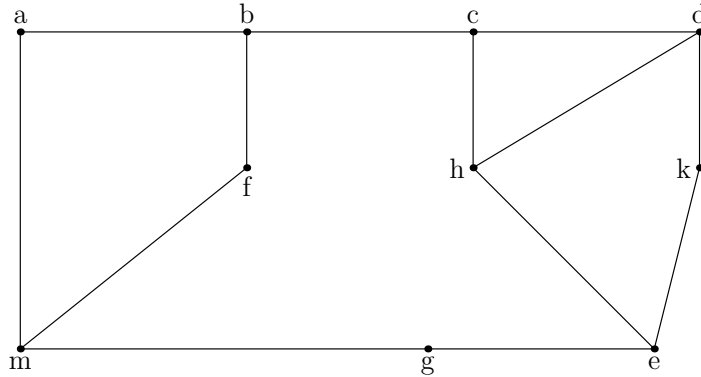


FIGURE 1

Problem 1. Consider the graph G in Figure 1,

- Show a path from vertex a to vertex k .
- Give an example of circuit which would contains both a and k . Also how many circuits which contains both a and k are there?
- Two vertices are connected if there is a path between them. The graph is connected if any two vertices are connected. Can you remove one edge from graph G in such a way that it will disconnects G ? (explain!)
- Find all sets of 2 edges whose removal disconnects the graph.
- What is the minimal number of vertex deletion required to disconnect G ? (explain!)
- Find the minimal edge cover of G .
- Find a maximal independent set of G .
- Please, draw subgraphs of vertices of degree 2.
- Please, also draw subgraph of vertices of degree 3.

Problem 2. List all **nonisomorphic** graphs with four vertices.