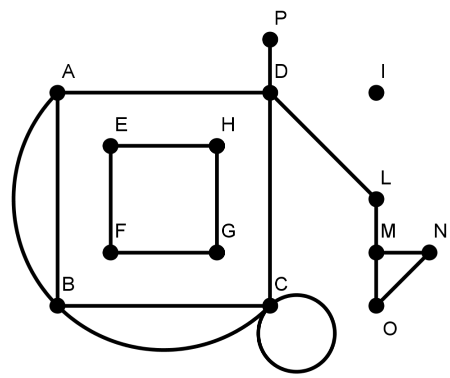
MA111 — Chapter 5 Review

1. Consider the following graph:



   (a) List the vertices.
   (b) List the edges.
   (c) List the loops.
   (d) List the multiple edges.
   (e) Determine the degree of each vertex.
   (f) Determine the number of components.
   (g) List the isolated vertices.
   (h) List the bridges.
   (i) List all paths from L to O.
   (j) Find a circuit of length 1.
   (k) Find a circuit of length 4.
   (l) Find a circuit of length 5.
   (m) Find a path of length 1.
   (n) Find a path of length 10.

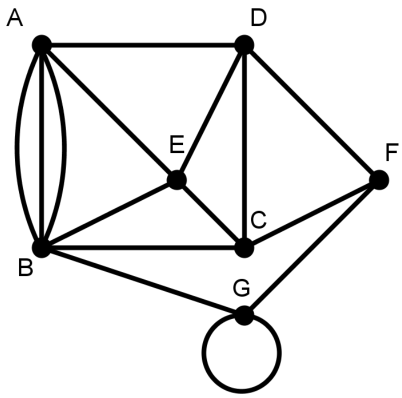
2. Draw a graph with the following vertices and edges: $V = \{A, B, C, D, E\}$, $E = \{AB, AD, AE, BE, BE, DE, EE\}$.

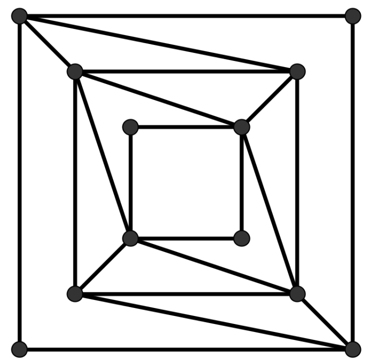
3. A graph has vertices with the following degrees: 0, 1, 2, 3, 4, 5, 4, 3, 2, 1, 0. Without drawing the graph, determine the number of edges.

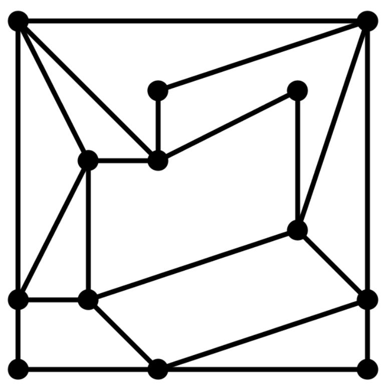
4. Is there a graph with vertices having the following degrees: 2, 4, 0, 3, 3, 2? If so, draw one; if not, explain why.

5. Is there a graph with vertices having the following degrees: 1, 2, 3, 2, 1, 4? If so, draw one; if not, explain why.

6. In each of the following graphs, determine whether there is an Euler path, an Euler circuit, or neither. If there is an Euler path, find one and label the edges in order. If there is an Euler circuit, find one and label the edges in order.



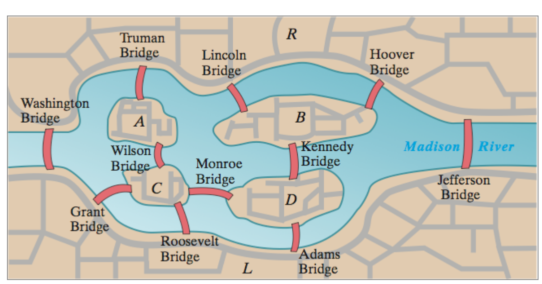




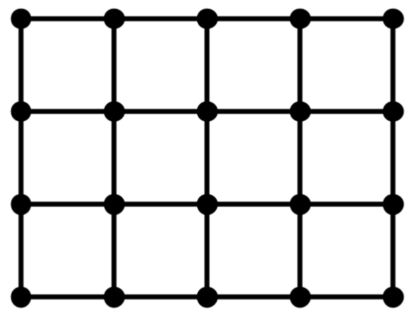
7. Draw a graph such that every vertex is even, but there is no Euler circuit.

8. Draw a graph such that there are exactly two odd vertices, but there is no Euler path.

9. Model the following system of land masses and bridges as a graph. Use the graph to determine an optimal closed exhaustive route across all of the bridges.



10. Eulerize the following graph.



11. Semi-Eulerize the following graph.