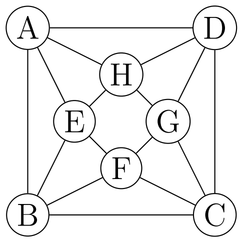
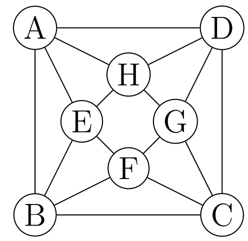
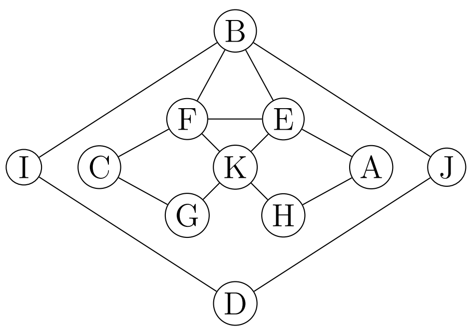
Worksheet 14 (Graph Theory 6): Hamiltonian Circuits

1. Draw two different Hamiltonian circuit in the graph below. Below each graph, list the vertices of your circuit in order.





2. Answer questions about the graph sketched below.

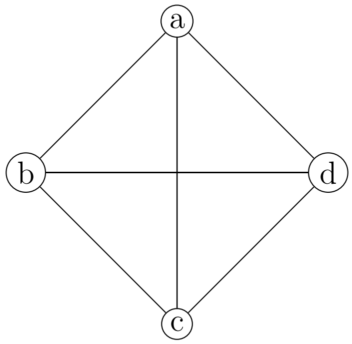


   (a) Draw a Hamiltonian path starting at vertex I. List the vertices of your circuit in order.

   (b) Draw a Hamiltonian path starting at vertex B or explain why this is not possible.

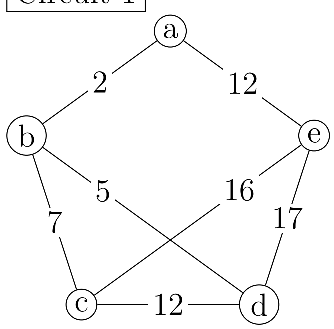
   (c) Find a Hamiltonian *circuit* or explain why this is not possible.

3. List *every* possible Hamiltonian circuit in the graph below. Give a numerical justification that you have all of them.



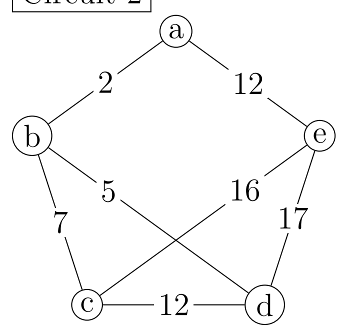
4. The following graph has two different Hamiltonian circuits. Highlight one on each copy of the graph and compute the total weight of the circuit.

Circuit 1



Weight: ____________

Circuit 2



Weight: ____________

Which Hamiltonian circuit has the smallest weight? ____________

5. Recall that Kruskal's Algorithm found a minimum weight spanning tree by selecting the cheapest edges that don't form a circuit. Do you think such an algorithm can be modified to find a minimum weight Hamiltonian circuit? What modifications would be needed? What might be some challenges?