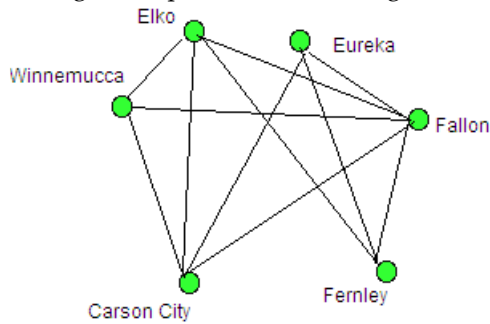


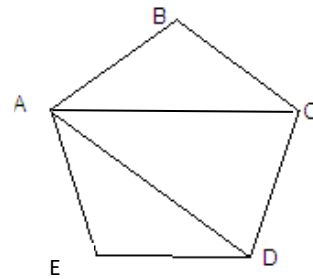
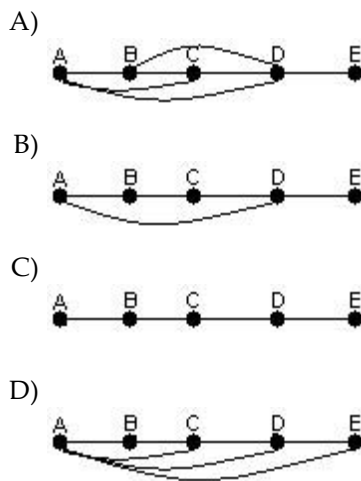
Discrete Math
Unit 12 Practice Test

Name _____

1. The graph models the flights between various cities for a small airline. Vertices represent the Cities and each flight is represented as an edge. How many flights are scheduled for Carson City?



- 2) Which of the following graphs is equivalent to the one shown?



- 3) Draw a graph with vertices A, B, C, D, and E, and with the following edges: AC, BE, CB, DD, ED, and BD.

- 4) Create a graph that models the bordering relationship among the states shown in the map. Use vertices to represent the states and edges to represent common borders.



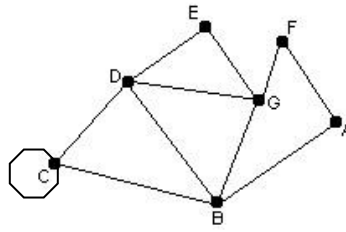
For # 5 – 8: Use the graph shown.

5) What is the degree of vertex C?

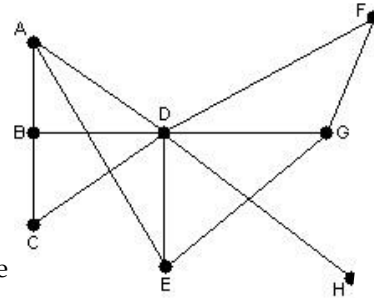
6) Is Vertex G odd or even?

7) Is vertex E adjacent to vertex F?

8) True or False: DB is a bridge.

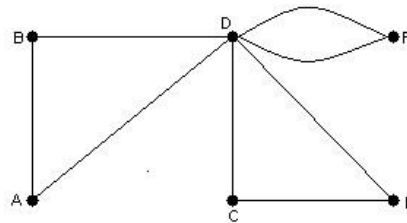


9) Is the route E, G, F, D, A, B, C, D, H describing an Euler Path, an Euler Circuit, or neither?

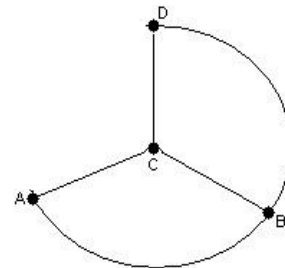


10) True or False: An Euler Circuit must start and end at the same vertex and must use every edge exactly one time.

11) For the graph shown, is there an Euler Path, an Euler Circuit, or neither?



12) For the graph shown, find an Euler Path or Circuit, if possible. (Specify which type you have found.)

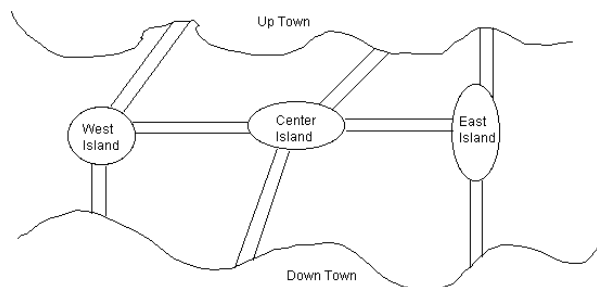


13) True or False? A graph with all odd vertices has at least one Euler circuit.

Use Euler's theorem to determine whether the graph has an Euler path (but not an Euler circuit), Euler circuit, or neither.

14) A graph has 26 even vertices and 2 odd vertices. Is there an Euler path, and Euler circuit, or neither? Explain your reasoning.

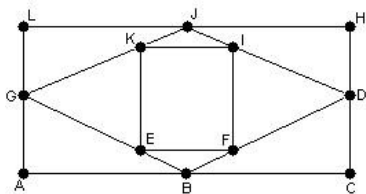
- 15) The layout of a city with land masses and bridges is shown.
Draw a graph to model the land masses and bridges.



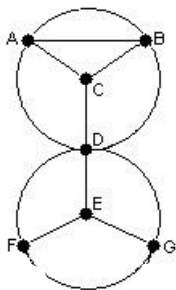
- 16) Use the graph you made in #15 to determine if the city residents would be able to walk across all of the bridges (starting on either bank) without crossing the same bridge twice. Explain.

For #17 – 18: Decide if the graph has an Euler path, Euler circuit, or neither.

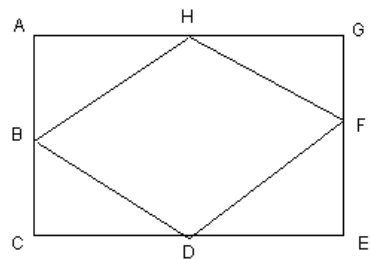
17)



18)

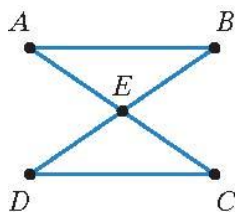


19) Is A, H, G, F, E, D, C, B, A is a Hamilton path, an Euler path, a Hamilton circuit, or Euler circuit, or none of these?



20) True or False? A Hamilton circuit must contain every vertex in the graph exactly once and must start and end at the same vertex.

21) Explain whether or not the graph shown must have Hamilton circuits.

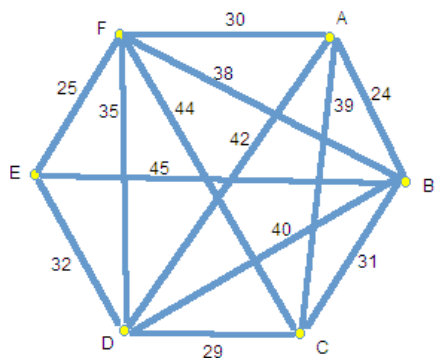


22) A complete graph has 7 vertices. How many Hamilton circuits exist?

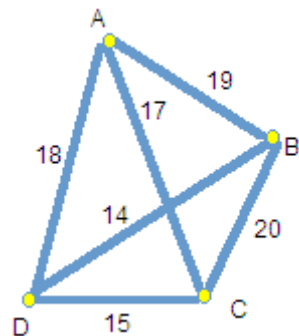
For #23 – 24: Use the weighted graph shown to answer the question.

23) Find the weight of edge AD.

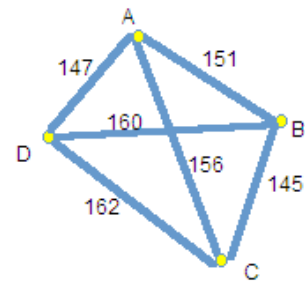
24) Find the total weight of the Hamilton circuit A, F, B, E, D, C, A.



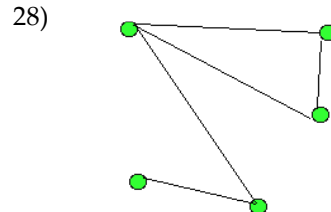
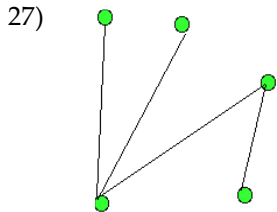
25) Jon is a traveling salesman for a pharmaceutical company. His territory includes four cities, and he needs to find the least expensive route to the cities and home. A) Starting at city D, what is the optimal route using the Brute Force Method? B) What is the weight of the optimal route?



- 26) Using the Nearest Neighbor Method starting with vertex C, approximate the weight of the optimal solution.

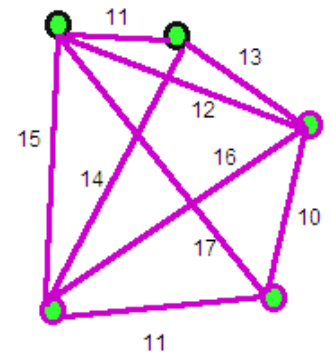


For 27 -28: Decide whether the graph is a tree. Explain your reasoning.

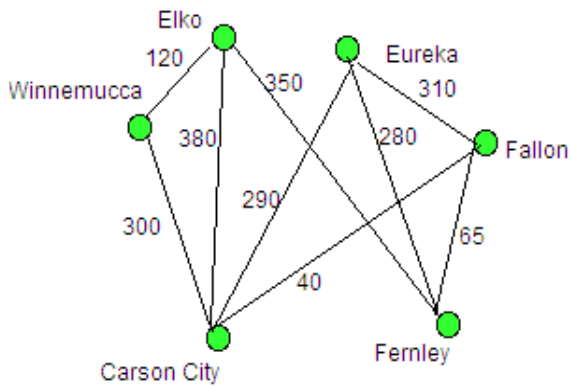


- 29) True or False? A spanning tree is a connected graph.

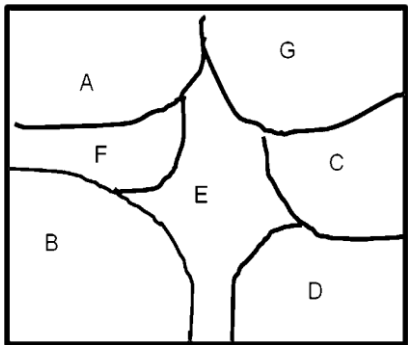
- 30) Use Kruskal's algorithm to find the weight of the minimum spanning tree for the weighted graph.



- 31) A small airline wants to make sure that the six cities it flies to are connected. The graph below shows the miles between the cities for each flight. Use Kruskal's algorithm to find the minimum flight plan to connect all six cities and its weight.



32) A) Represent the map below as a graph. B) Use graph coloring to find the minimum number of colors needed to color the graph.



33) Suppose that 5 Student Leadership committees all want to meet during lunchtime.

a) Make a graph representing the conflicts. What is the degree for Accounting?

	Fundraising	Activities	Communication	Service	Accounting
Amy	X		X		X
Heather	X	X		X	
Sara			X	X	X
Amber	X	X	X		

b) What is the least number of days required for all committees to meet without out any scheduling conflicts?