

1. Consider the graph shown.

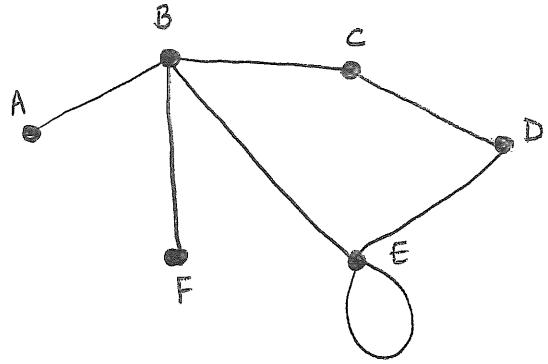
Is the graph simple?

Is it complete?

Is it connected?

How many components does it have?

Does it have an Euler circuit or path? (explain)



2. Draw a graph which meets the conditions or explain why it cannot be done.

(a) A graph with six vertices, all of which have degree 3

(b) A graph with eight vertices, all of which have degree 1

(c) A graph with seven vertices, all of which have degree 1

3. Suppose we have a **complete** graph with 10 vertices.

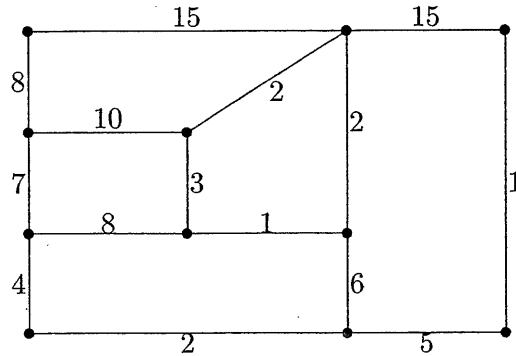
(a) How many edges does the graph have? (show the formula and the answer)

(b) What is the degree of each vertex?

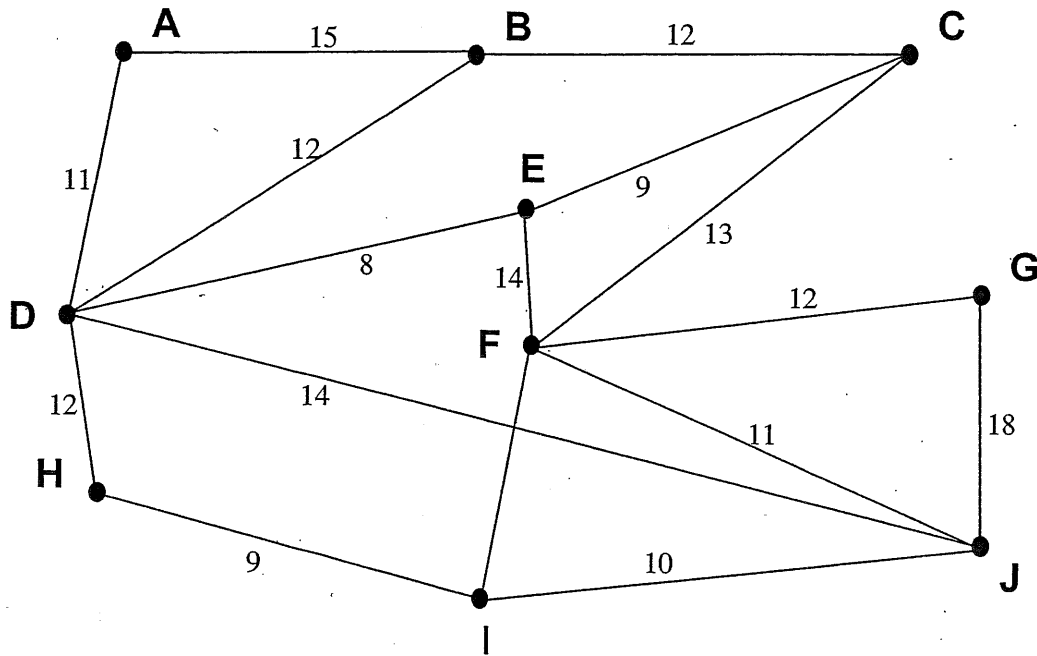
(c) Does this graph have an Euler circuit, an Euler path, or neither? (explain)

(d) How many distinct Hamiltonian circuits does it have? (show the formula and the answer)

- 4 The graph shown has 11 vertices and 15 edges. Use Kruskal's algorithm to find a minimum spanning tree for this graph.



- 5 (a) How many vertices are in the graph below?
 (b) How edges will there be in a spanning tree of the graph below?
 (c) Use Kruskal's algorithm to find a minimum spanning tree for the graph below. List the edges in the order you use them in the algorithm and give the total weight of the minimum spanning tree.

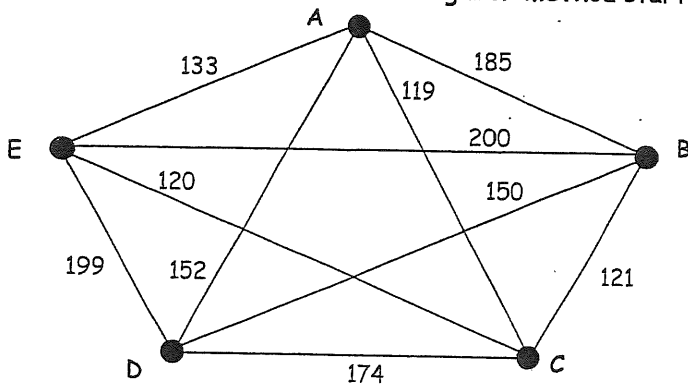


6 The distances between five cities in South Carolina are given in the table below. The cities are Aiken (A), Columbia (C), Greenville (G), Spartanburg (S), and Charleston (Ch). We will now try to plan the route for a traveling salesman visiting each of these cities.

Draw a weighted complete graph that represents this information. Label your vertices.

	A	C	G	S	Ch
A	--	52	106	131	126
C	52	--	101	93	114
G	106	101	--	30	210
S	131	93	30	--	202
Ch	126	114	210	202	--

7 **Hamiltonian Circuit.** Jim the Shoeshine Sales Representative must display the latest shoeshine products in four distant cities before returning home. He is taking the company jet, and has been ordered to choose the route that will have the minimum travel time (and thus the least fuel). Use the **Nearest Neighbor** method starting at B.



8 **Hamiltonian Circuit.** Elizabeth Taylor plans to visit five different grave sites of five different husbands. She demands a route which will minimize the travel time involved.

Use the **Cheapest Link** (aka Sorted Edges) algorithm to find a possible circuit.

