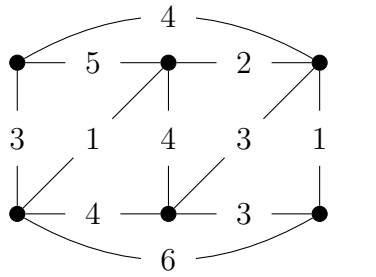
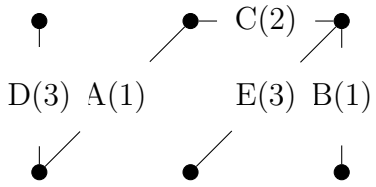
Frank Cline
Math 307
HW 8

6.6

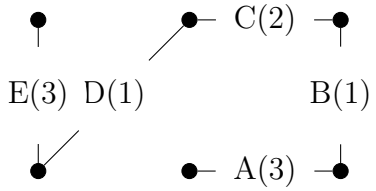
10. (a) Use Kruskal's algorithm to find a minimum spanning tree of the graph below. Label the edges in alphabetical alphabetical order as you choose them. Give the weight of the minimum spanning tree.





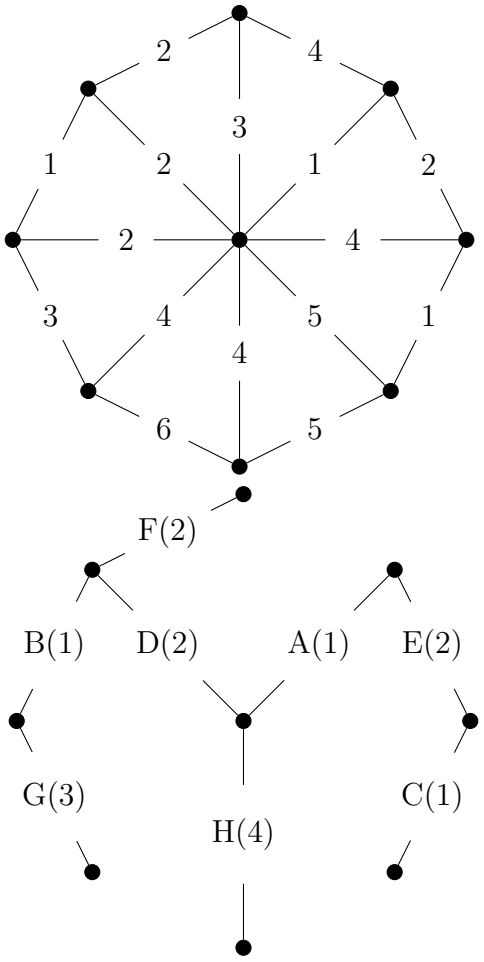
The weight of the spanning tree is $1 + 1 + 2 + 3 + 3 = 10$.

(b) Repeat part (a) with Prim's algorithm, starting at the lower middle vertex.



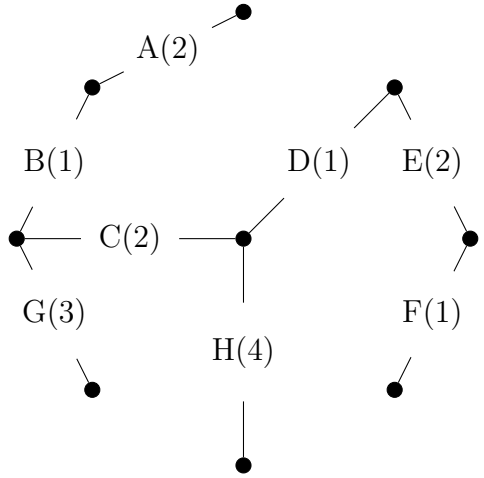
The weight of the spanning tree is $1 + 1 + 2 + 3 + 3 = 10$.

11. (a) Use Kruskal's algorithm to find a minimum spanning tree of the graph below. Label the edges in alphabetical alphabetical order as you choose them. Give the weight of the minimum spanning tree.



The weight of the spanning tree is $1 + 1 + 1 + 2 + 2 + 2 + 3 + 4 = 16$.

(b) Repeat part (a) with Prim's algorithm, starting at the top vertex.

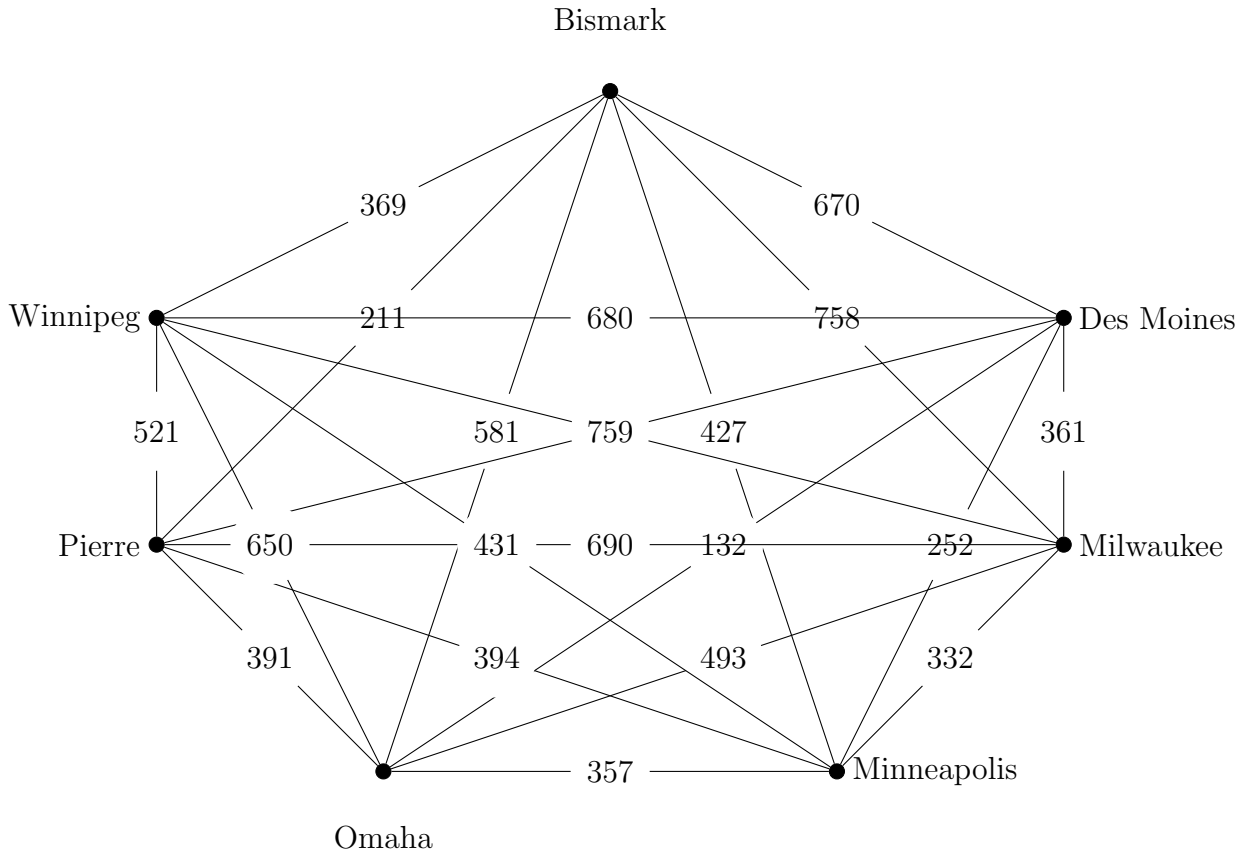


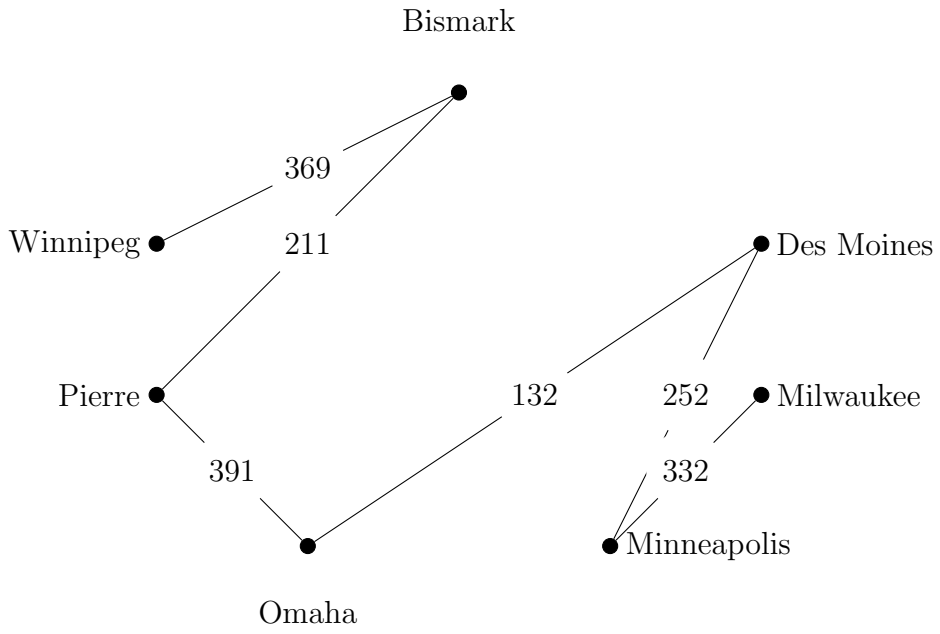
The weight of the spanning tree is $2 + 1 + 2 + 1 + 2 + 1 + 3 + 4 = 16$.

13. An oil company wants to connect the cities in the mileage chart below by pipelines going directly between cities. What is the minimum number of miles of pipeline needed?

	Des Moines	Milwaukee	Minneapolis	Omaha	Pierre	Winnipeg
Bismark	670	758	427	581	211	369
Des Moines		361	252	132	492	680
Milwaukee			332	493	690	759
Minneapolis				357	394	431
Omaha					391	650
Pierre						521

Note: Center vertex is Bismark.





The minimum number of miles of pipe needed would be
$132 + 211 + 252 + 332 + 369 + 391 = 1687$ miles.