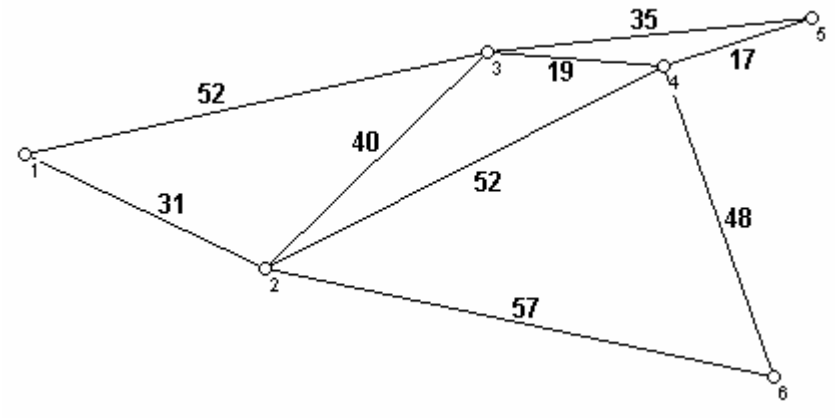
Name _____

56:272 Integer Programming & Network Flows
Quiz #9 – Fall 2003

1. **. Location in a network:** Consider the network,



where the numbers on the edges are distances. The demand at the nodes are all equal, which we may consider to be 1 unit. The table of shortest path lengths found by Floyd's algorithm is:

	1	2	3	4	5	6
1	0	31	52	71	87	88
2	31	0	40	52	69	57
3	52	40	0	19	35	67
4	71	52	19	0	17	48
5	87	69	35	17	0	65
6	88	57	67	48	65	0

a. At which node is the median (1-median) of the network? ___

b. What is the objective function value of the median problem at this node? ____

c. Consider the 2-median problem. What is the objective function value at the solution with nodes 3 and 4 selected as facility locations? _____

d. Which node is the vertex center (node center) of the network? ____

e. What is the objective function $\sigma(x)$ of the center problem at this node? ____

f. We are interested in finding the *absolute* center of the network, which might not be located at one of the nodes. The lower bound on the objective function $\sigma(x)$ on each edge is shown below:

i	j	LB
2	4	44
2	3	48
2	6	50
1	3	51.5
4	6	55.5
3	4	59.5
3	5	59.5
1	2	63
4	5	70.5

Which edges are candidates for containing the absolute center? *(circle above.)*