Write your answers in the D1 answer book for this paper.

1.

	A	B	C	D	E	F	G
A	–	43	52	47	59	53	55
B	43	–	59	45	46	52	47
C	52	59	–	51	50	55	51
D	47	45	51	–	52	49	55
E	59	46	50	52	–	57	48
F	53	52	55	49	57	–	55
G	55	47	51	55	48	55	–

The table above shows the least distances, in metres, between seven classrooms, A, B, C, D, E, F and G. A teacher needs to visit each classroom, starting and finishing at A, and wishes to minimise the total distance travelled.

(a) Show that there are two nearest neighbour routes that start from A. State these routes and their corresponding lengths.

(3)

(b) Starting by deleting A, and all of its arcs, find a lower bound for the length of the teacher's route.

(3)

(c) Use your results to write down the smallest interval which you can be confident contains the optimal length of the teacher's route.

(1)

(Total for Question 1 is 7 marks)