6.

	A	B	C	D	E	F	G	H
A	-	24	19	28	25	32	29	31
B	24	-	22	31	25	23	37	41
C	19	22	-	18	21	41	31	35
D	28	31	18	-	24	21	27	26
E	25	25	21	24	-	17	31	25
F	32	23	41	21	17	-	26	31
G	29	37	31	27	31	26	-	24
H	31	41	35	26	25	31	24	-

The table shows the least distances, in km, between eight towns. Imani wants to visit all eight towns. She needs to find a route which minimises the distance travelled, starting and finishing at A.

(a) Show that there are two nearest neighbour routes starting at A. You must make your method clear and state the routes and their lengths.

(4)

(b) State, giving a reason, which route from part (a) gives the better upper bound for the length of Imani's route.

(1)

(c) By deleting A and all of its arcs, use Prim's algorithm, starting at B, to obtain a lower bound for the length of Imani's route. You must show your working.

(4)

A second lower bound of 172 km is obtained by deleting H.

(d) Write down the smallest interval that must contain the optimal length for Imani's route.

(1)

(Total for Question 6 is 10 marks)