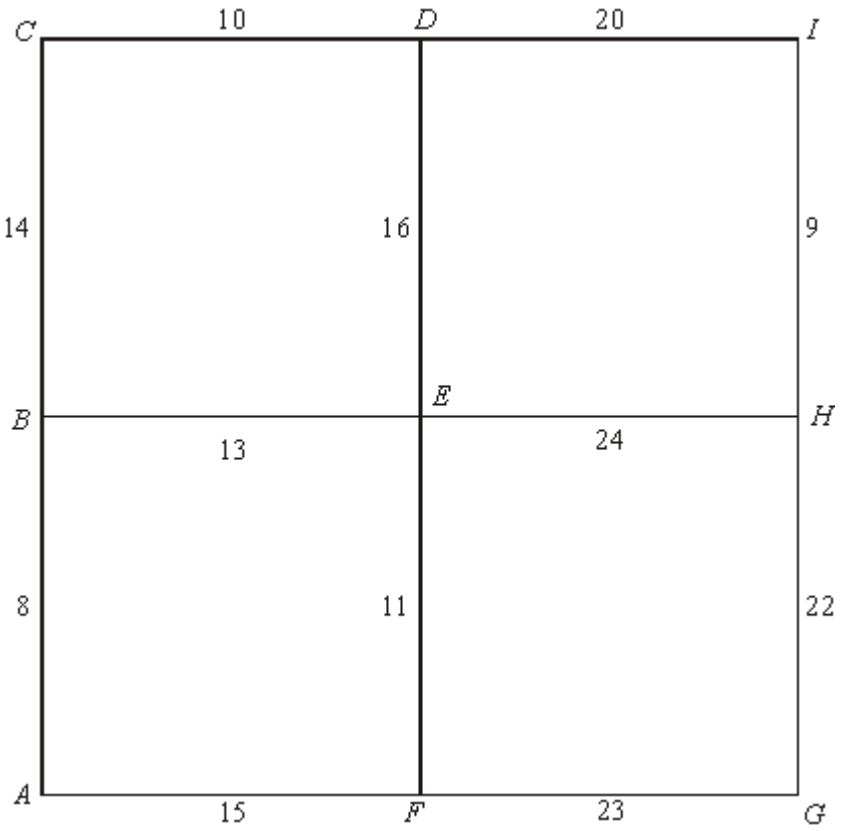
Kruskal's Algorithm

Example 1

The following network has 9 vertices. The numbers represent the weights of the edges.



(a) Use Kruskal's algorithm, showing the order in which you select the edges, to find the minimum spanning tree for the network.

(b) State the weight of your minimum spanning tree.

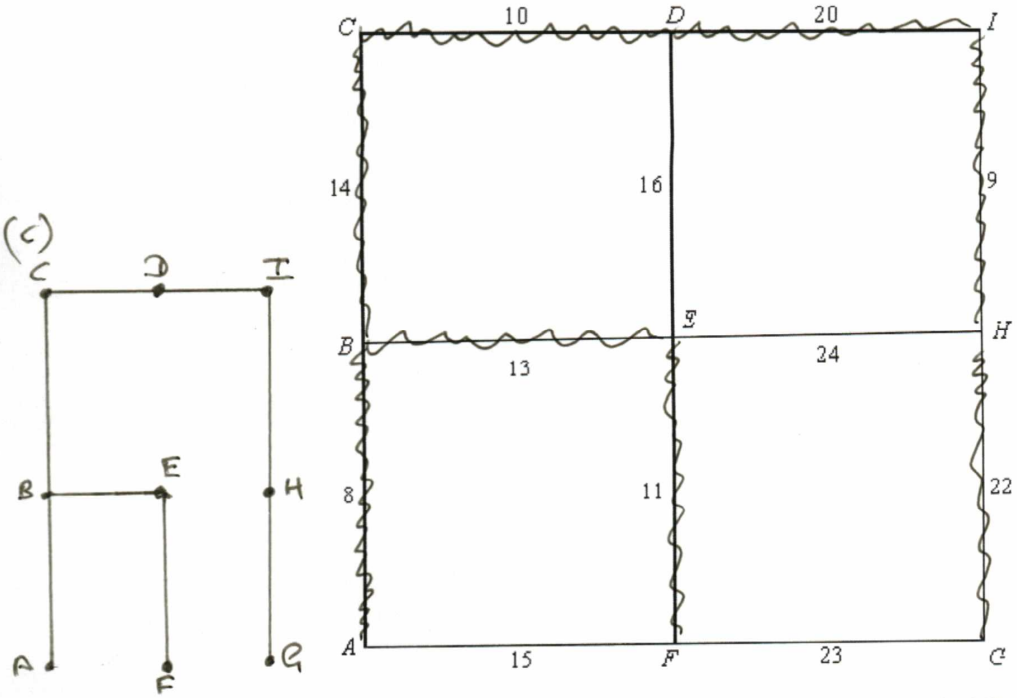
(c) Draw your minimum spanning tree.

SOLUTION

Kruskal's Algorithm

Example 1

The following network has 9 vertices. The numbers represent the weights of the edges.



(a) Use Kruskal's algorithm, showing the order in which you select the edges, to find the minimum spanning tree for the network.

(b) State the weight of your minimum spanning tree.

(c) Draw your minimum spanning tree.

(a) we start with the smallest weight

AB = 8 (mark off as you go along)

then IH = 9 (next smallest)

then CD = 10

then EF = 11

then BE = 13

then BC = 14

then DI = 20 (we do not select AF since these are already connected through B and E. This would create a "cycle" which we do not want)

finally HG = 22 Now all vertices are connected

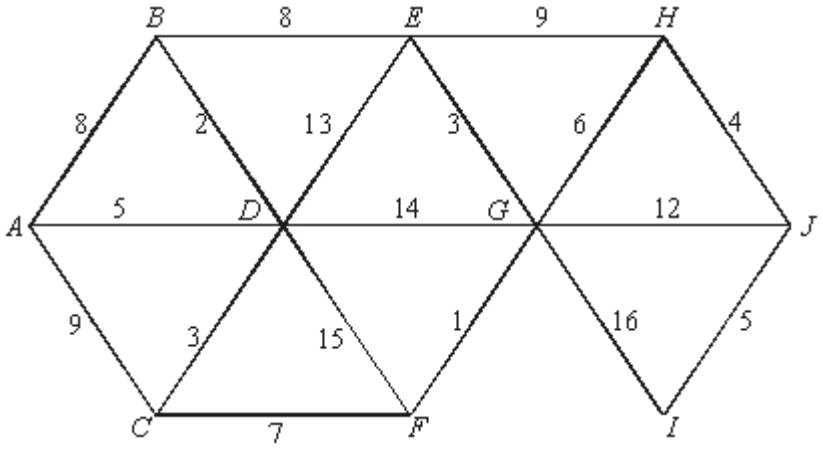
(b) Add up the selected weights = 107

(c)

Now try these

Question 1.

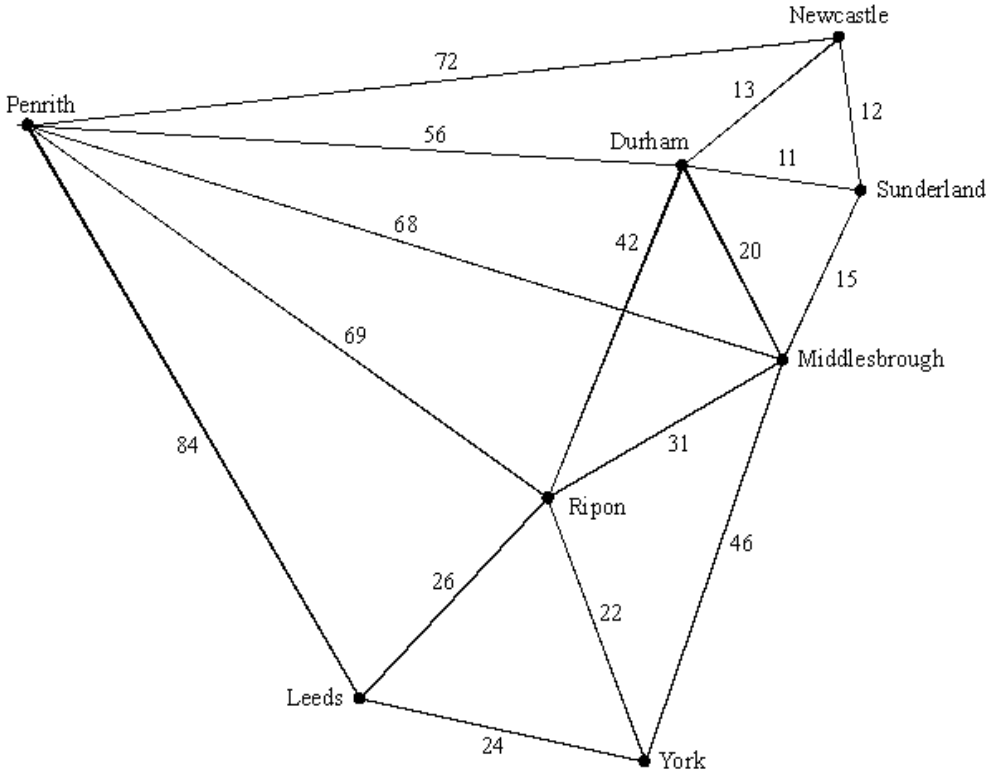
The following diagram shows the lengths, in miles, of roads connecting ten towns.



Use Kruskal's algorithm, showing the order in which you select the edges, to find the minimum spanning tree for the network. Draw your minimum spanning tree and state its length.

Question 2.

The following diagram shows a network of roads connecting eight towns. The number on each arc represents the distance, in miles, between two towns.



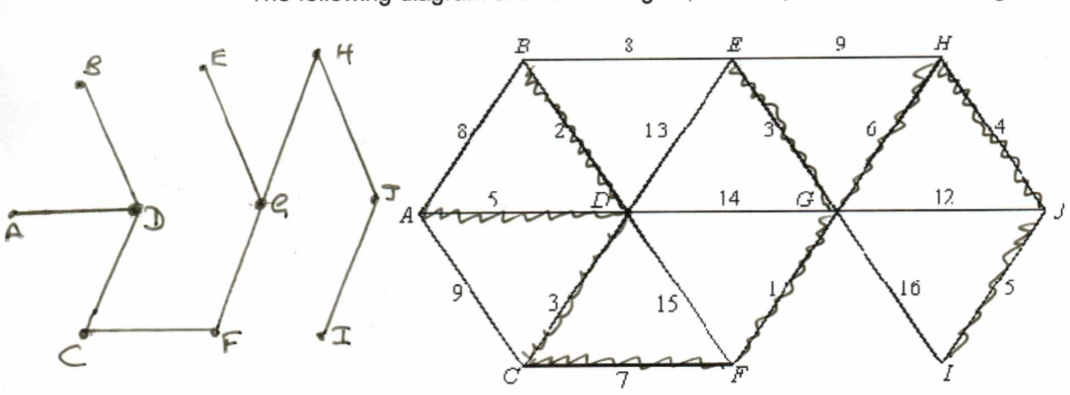
Use Kruskal's algorithm to find the minimum spanning tree for the eight towns. State the length of your minimum spanning tree.

SOLUTIONS

Now try these

Question 1.

The following diagram shows the lengths, in miles, of roads connecting ten towns.



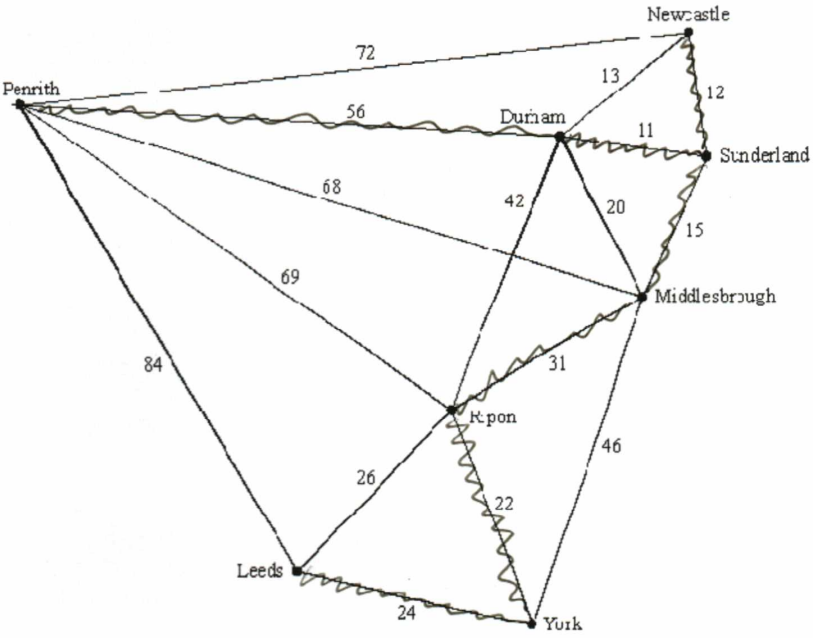
GF = 1
BD = 2
DC = 3
EG = 3
HJ = 4
AD = 5
IJ = 5
HG = 6
CF = 7

36 miles

Use Kruskal's algorithm, showing the order in which you select the edges, to find the minimum spanning tree for the network. Draw your minimum spanning tree and state its length.

Question 2.

The following diagram shows a network of roads connecting eight towns. The number on each arc represents the distance, in miles, between two towns.



Use Kruskal's algorithm to find the minimum spanning tree for the eight towns. State the length of your minimum spanning tree.

D → S = 11
S → N = 12
S → M = 15
R → Y = 22
Y → L = 24
R → M = 31
P → D = 56

length = 171 miles