

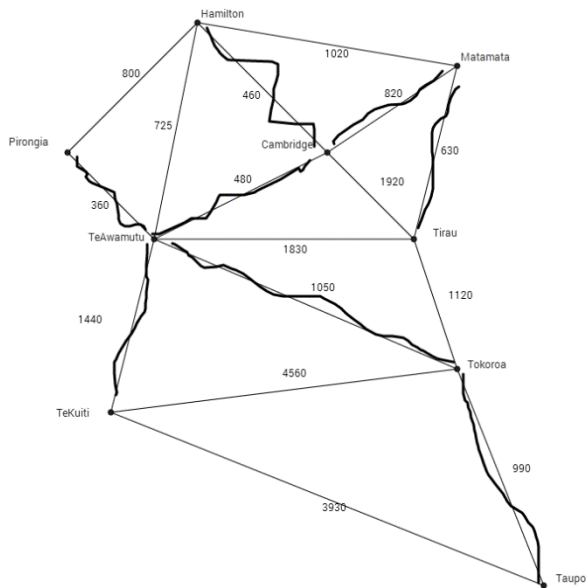
For the Taupo Club I need to find the shortest route from Hamilton to Taupo.

The route Hamilton – TeAwamutu – Tokoroa – Taupo = $29 + 70 + 66 = 165\text{km}$

The route Hamilton – Cambridge – Tirau – Tokoroa – Taupo = $23 + 32 + 32 + 66 = 153\text{km}$

So this route is the shortest Hamilton – Cambridge – Tirau – Tokoroa – Taupo = 153km

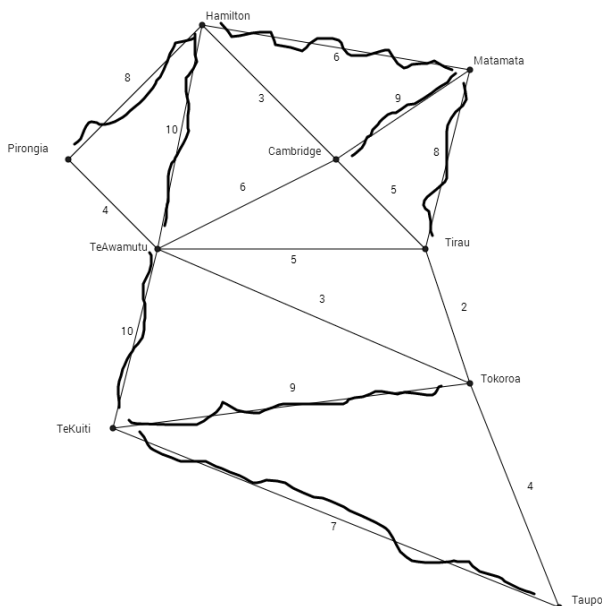
1



For the Hamilton Club I need the minimum spanning tree based on cost. To find this I add the cheapest roads one by one until I only have a tree with all towns connected.

The minimum cost is the total of the roads I have put in which is \$6 230 000. The tree is the roads marked with wiggly lines on the diagram.

2



For the Tirau Club I need the spanning tree with the maximum scenic value. I add the highest scenic value roads in order to get the tree in the diagram.

The roads I chose are marked with wiggly lines on the diagram.

The maximum scenic value is 67.

3

For the Tokoroa club I need to see if the network is traversable. I can work out the order of each node by counting how many roads go into them.

Hamilton 4 Matatamata 3 Pirongia 2 Cambridge 4 TeAwamutu 6 Tirau 4 TeKuiti 3 Tokoroa 4 Taupo 2

Because Matamata and TeKuiti are odd and the rest even the network is not traversable starting and finishing at the same place. ④

There is no network that can satisfy all three clubs but I think the best thing to do is to choose the minimum cost one as that saves money and we don't have much of that. It should be spent on trains instead.