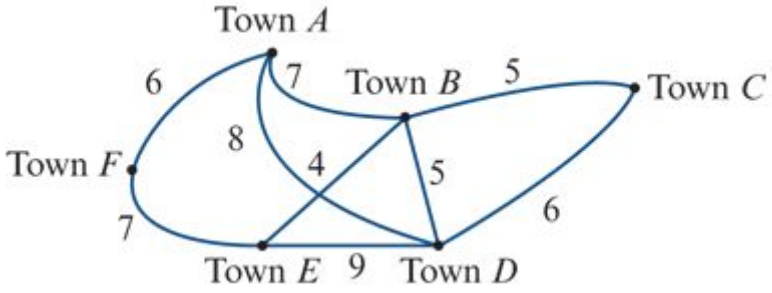
Concept – Weighted Graphs and the shortest path

A weighted graph _____

these numbers could represent _____

An example of this is shown below, where the weights represent the amount of fuel (in L) used by a truck to travel between each of the towns.



You can see from this weighted graph that when going from Town E to Town D a truck

would use _____ L of fuel, and when following the walk F - E - B - C it would use _____ L

One common application of these types of networks is to find the shortest path. In this situation the shortest path will be the one where the truck uses the least fuel.

How to find the shortest path

1. List all of the possible paths between the two points (recall paths_____)
2. Find the weight of each possible path.
3. Identify the smallest weight, this is the shortest path.

For example, what is the shortest path from Town F to Town D in the network above? There are four possible paths

1.

2.

3.

4.

The shortest path between Town F and Town D is _____. Following this

path the truck would use _____ L of fuel.

Worked Example

Find or draw a weighted graph. List all possible paths between two vertices on this graph and calculate the weights of these paths. Finally clearly identify the shortest path.