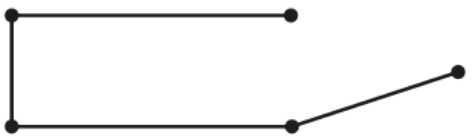
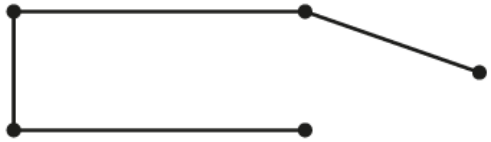
Graphs and networks 2C

1 **a** and **b** trees.
c is not a tree, as it is not a connected graph.
d is not a tree, it contains a cycle.

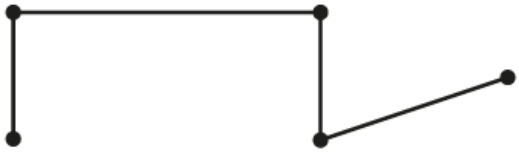
2 **i**



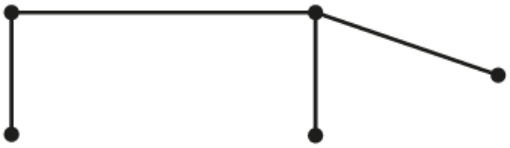
ii



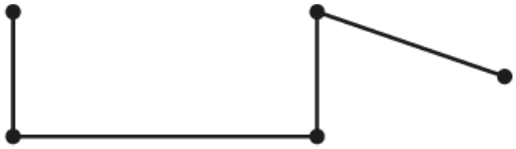
iii



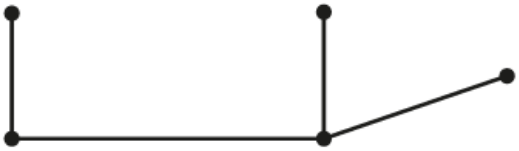
iv



v



vi



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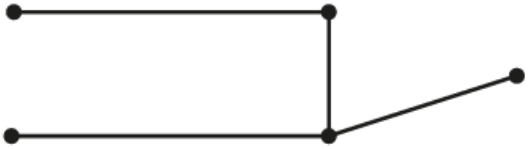
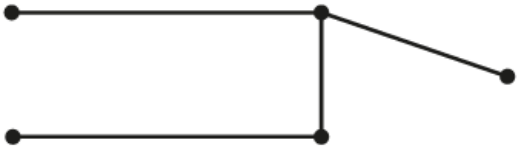
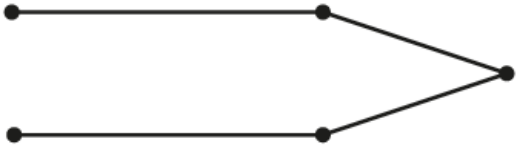


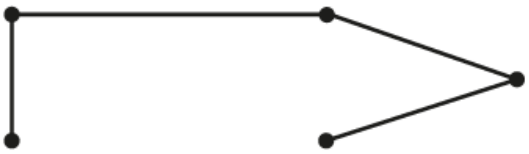
viii



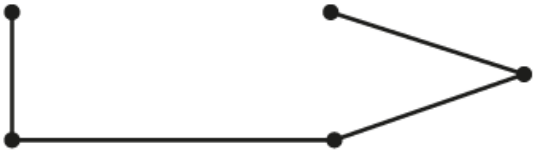
ix



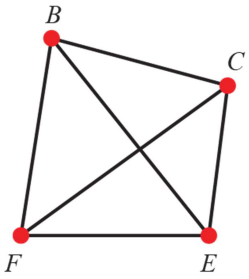
2 **x**



xi



3



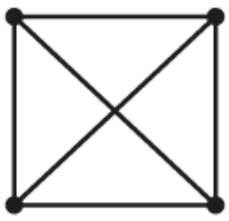
4 A, C are isomorphic to the graph on the right. B cannot be isomorphic as it has a vertex of degree 3 and the original graph does not.

5 **a** **i** Tree is a connected graph with no cycles.

ii Spanning tree is a subgraph which includes all vertices and has no cycles (so is therefore also a tree).

b The graph is not connected so it does not have a connected subgraph either.

6 **a**



b Each vertex in K_n is connected to all the other vertices so it has degree $n-1$.

c Each vertex is connected to 19 others so the total number of edges is $\frac{20\times 19}{2}=190$ (we divide by 2 to avoid double counting).

Challenge