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QUESTION WORKBOOK

# Minimum spanning trees: Prim and Kruskal

Decision Mathematics 1 · Year FM

6 questions · 20 marks

PRINT EDITION

**SECTION A** · Warm-up

- A1** Define a minimum spanning tree and state how many edges it has for a network of  $n$  nodes. [2]

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- A2** Describe Prim's algorithm and Kruskal's algorithm in one sentence each, and say what they have in common. [3]

**SECTION B** · Standard

- B1** Apply Prim's algorithm from A to the network with AB 5, AC 7, AD 9, BC 4, BE 9, CD 3, CE 6, DF 10, EF 2, listing the edges in the order they are added. [4]

- B2** Apply Kruskal's algorithm to the same network, stating which edges are rejected and why. [4]

- B3** Explain why Prim's algorithm is preferred when the network is given as a distance matrix. [3]

### SECTION C · Stretch

- C1** A network has 8 nodes and 15 edges, and two of its edges have equal weight. Explain what this means for Prim and Kruskal. [4]