

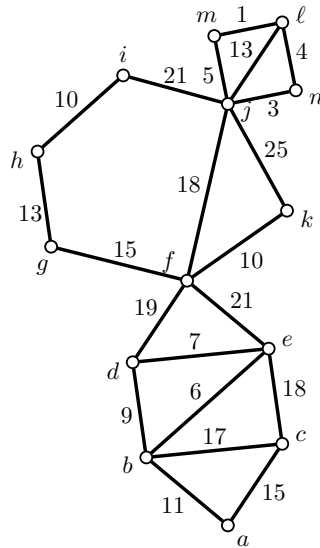
Math 4710/6710 – Graph Theory – Fall 2019

Extra problems (not from the book)  
and extra information on problems from the book

**X1.** Find a breadth-first search tree in the graph of Figure 6.2(a) in Bondy & Murty, starting at vertex 10. List the edges of the tree in the order they are added to the tree, and draw the tree on a copy of the graph.

**X2.** Repeat problem X1, but construct a depth-first search tree instead of a breadth-first search tree.

**X3.** For the graph shown below, find a minimum weight spanning tree by using (i) Kruskal’s algorithm, and (ii) the Jarník-Prim algorithm, starting at  $a$ . In each case show the edges of the tree on the graph, and provide a list of the edges of the tree in the order in which you added them to the tree.



**X4.** Apply Dijkstra’s Algorithm to the weighted digraph shown below to find shortest paths from  $a$  to every other vertex. At each step draw a *separate copy* of the graph, showing the current outbranching, with permanent arcs solid and tentative arcs dashed, and with the value of  $\ell(v)$  shown next to each vertex  $v$ .

