

MATH 2113/CSCI 2113, Discrete Structures II

Winter 2008

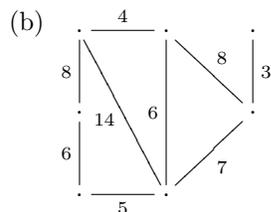
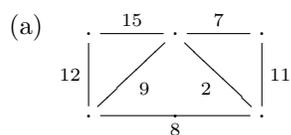
Toby Kenney

Homework Sheet 8

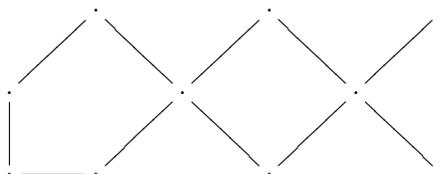
Due: Wednesday 26th March: 1:30 PM

Compulsory questions

1 Find minimal spanning trees for the following graphs:



2 How many spanning trees are there for the following graph?



3 (a) What is the minimum number of cycles that a graph with 5 vertices and 6 edges can have? Justify your answer.

(b) Draw a graph with 5 vertices, 6 edges and the number of cycles in your answer to (a). [Careful – it's easy to draw a graph with too many cycles.]

4 (a) How many trees are needed to cover all the edges of K_5 (the complete graph on 5 vertices)? i.e. we want a collection of trees with vertices chosen from the vertices of our K_5 , such that the union of their edges is the collection of all edges of the K_5 . Justify your answer.

(b) Draw a collection of this many trees that cover the edges of the K_5 .

5 Let T be a tree with $n \geq 3$ vertices. Let G be a graph obtained by adding one new edge to T . Show that G contains exactly one cycle.