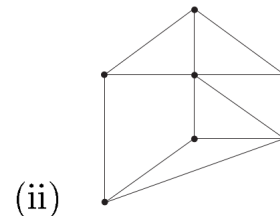
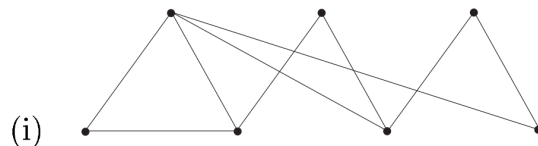


# GRAPHS AND NETWORKS (MATH20150)

## Problem sheet 6

1. Prove that each edge of a connected graph belongs to some spanning tree.
2. What does Chvátal's theorem tell us about a graph with degree sequence 2, 3, 4, 4, 4, 4, 5?
3. Find the closures of the following two graphs. Is any of these graphs hamiltonian?



4. 12 people are meeting for dinner, and each one of them knows at least 6 other people from this group. Is it possible to seat them all at a round table so that each person is seated between persons they know?  
Hint: It has to do with Hamiltonian graphs.
5. You are given 10 dominoes with the following pairs of dots on them:

$(1, 2), (1, 4), (5, 1), (3, 2), (6, 1), (6, 5), (4, 5), (2, 5), (2, 4), (3, 4).$

Can you arrange the dominoes in a circle so that every pair of touching numbers are the same? Hint: Consider a graph with set of vertices  $\{1, 2, 3, 4, 5, 6\}$ .