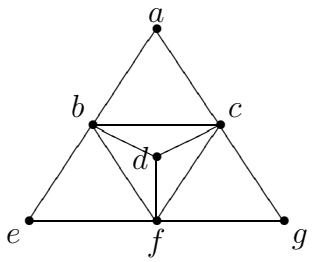
Math 1001 Quiz 2 Solutions

1. (3 points) Describe a Hamilton circuit in the following graph. Write your answer as a list of vertices.



This was a mistake: There is no Hamilton circuit in this graph. One Hamilton *path* is given by a, b, e, f, g, c, d.

2. (4 points, 1 each) True or false. Circle the correct answer, no justification.

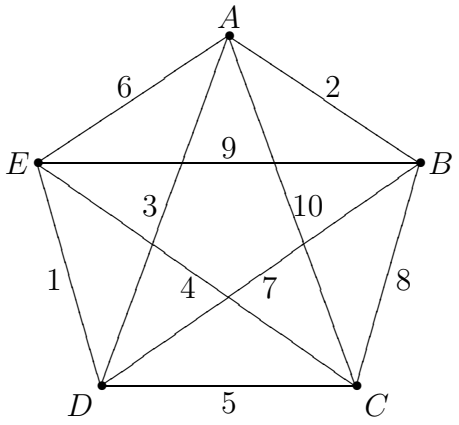
TRUE You can't tell whether a graph has a Hamilton cycle by checking the degrees of the vertices.

FALSE The cheapest-link algorithm doesn't always find the optimal solution to the travelling salesman problem.

FALSE The complete graph on 10 vertices, called K_{10} in the book, has $10! = 3,628,800$ different Hamilton circuits.
It has 9! Hamilton circuits.

TRUE The brute-force algorithm usually takes too long because there are too many possibilities to check.

3. (5 points) The next questions refer to the following weighted graph.



(a) (3 points) Find a Hamilton cycle using the nearest-neighbor algorithm starting at B.
The nearest-neighbor algorithm gives you the circuit B, A, D, E, C, B.

(b) (2 points) Find a Hamilton cycle using the cheapest-link algorithm.
The cheapest-link algorithm gives you the circuit A, B, C, E, D, A. You might get a slightly different answer if you start at a different vertex or go in the opposite direction.