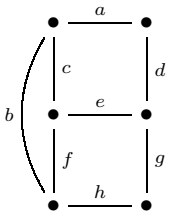
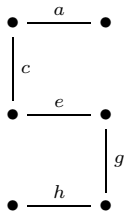
MAD 5932 Applied Graph Theory **Quiz 3** 31 Jul 2009 **Name:** _____
Show **ALL** work for credit; Give exact answers when possible.

1. For the graph $G$ below left and the spanning tree $T$ given by the edges $\{a, c, e, g, h\}$ below right

$G$ 


$T$ 


   (a) Find the fundamental system of edge-cuts associated with $T$.

   (b) Find the fundamental system of cycles associated with $T$.

   (c) Find the other non-null elements of the cycle space $W_C(G)$ for $G$ not listed in part (b).

2. How many vertices does the simple graph $G$ have if

   (a) $G$ is planar has 40 edges and 12 faces.

   (b) $G$ is planar and all 8 faces have degree 3.

   (c) $G$ is planar, self dual ($G$ is isomorphic to its Poincaré dual graph) and has 13 faces.

   (d) $G$ is planar, self dual and has 30 edges.

   (e) $G$ is planar, all faces have degree 3 and there are 2 less vertices than faces.