

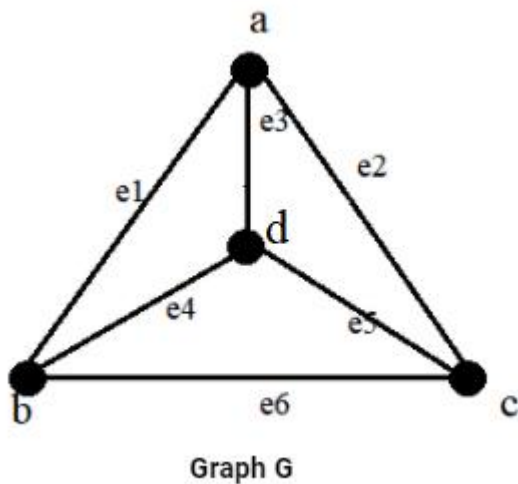
GRAPH THEORY ASSIGNMENT 2

Smilewin

CS19B1053

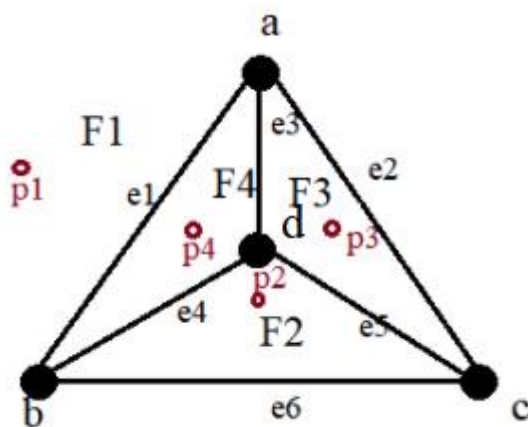
1. Show that the complete graph of four vertices is self-dual.

Answer:

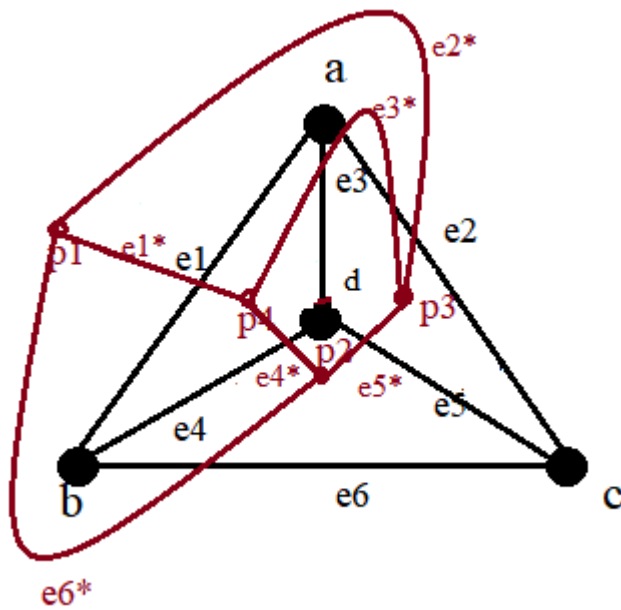


In the above graph a, b, c, d are the vertices and e_1-e_6 are the edges.

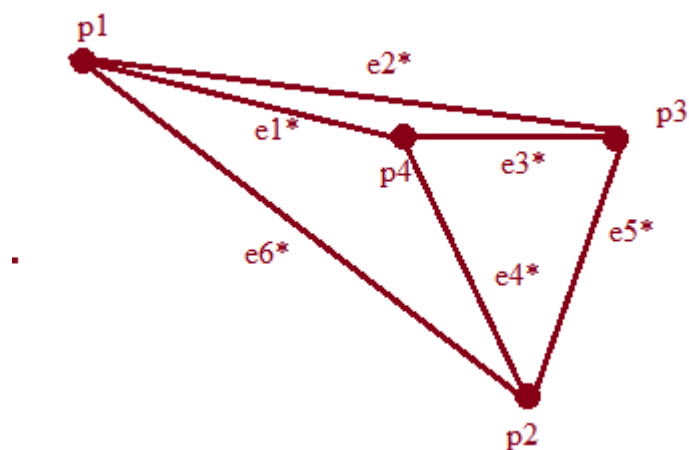
Observing the graph, we identify 4 regions. Marking regions (F_1-F_4) and points (p_1-p_4) for the regions:



Now the dual of Graph G:



Final Graph G^* :



On Observing the above graph, it's clear that it's a complete graph of four vertices.

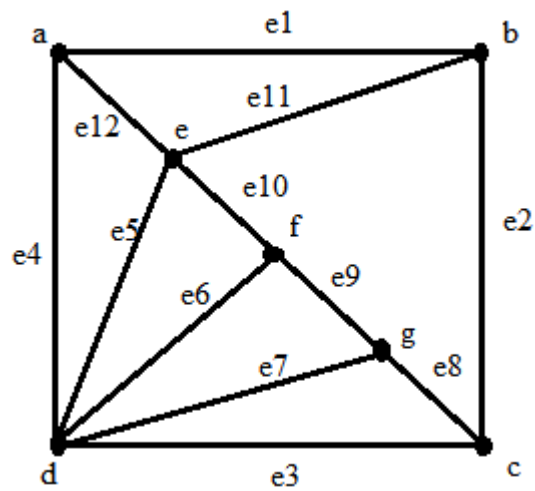
Graph G and G^* have the same number of vertices, same number of edges and one to one correspondence. Therefore, G and G^* are isomorphic.

Hence a complete graph of 4 vertices is self dual.

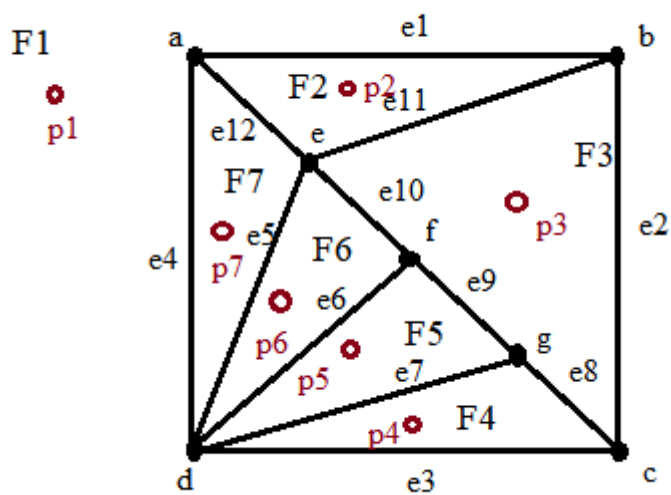
2. Give another example of a self-dual graph and justify

Answer:

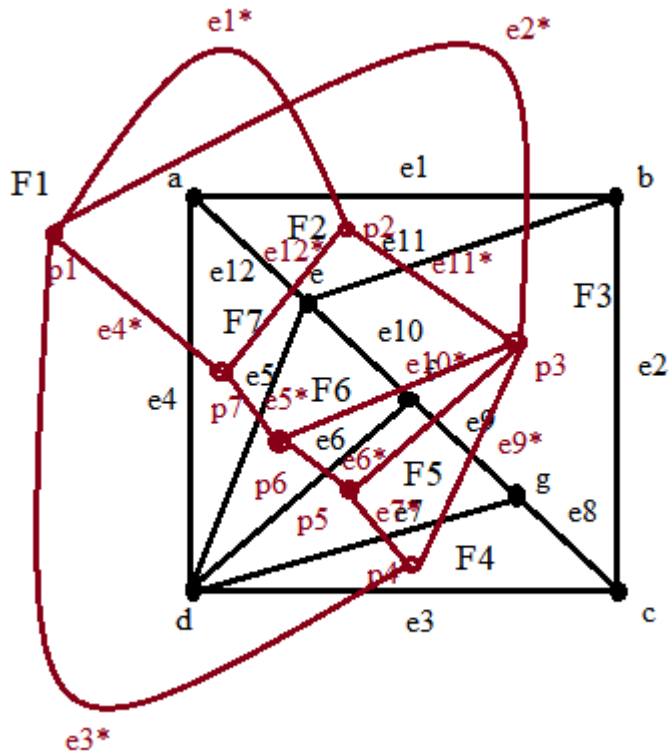
Consider the following Graph G



Number of Regions is 7. Marking regions and points of region:



Now the dual of Graph G , G^* :



Since G and G^* have same number of vertices, same number of edges and one to one correspondence. G and G^* are isomorphic.

Hence Graph G is self dual.