

True or False and a short reason

1. The wheel graph  $W_n$  is self dual.
2. The dodecahedron has 12 faces, 30 edges and 20 vertices.
3. The Petersen graph contains a subgraph homeomorphic to  $K_5$ .
4. If the connected graph  $G$  has  $|E| = |V| + 3$  then the cycle space  $W_C(G)$  has 15 non-null vectors.
5. A network with a unique maximum flow, has a unique minimum cut.
6. If  $n, m \geq 2$  and  $n + m \geq 8$  then  $K_{n,m}$  is non-planar.
7. For all complete bipartite graphs  $\kappa_v(K_{n,m}) = \delta_{\min}(K_{n,m})$
8. Each maximal matching is a maximum matching.
9. For a simple graph  $G$ , the minimum number of vertices in a vertex cover of  $G$  can be strictly bigger than the maximum number of edges in matching of  $G$ .
10. There are 5 isomorphism types of loop-free simple digraphs with 3 vertices and 3 arcs.