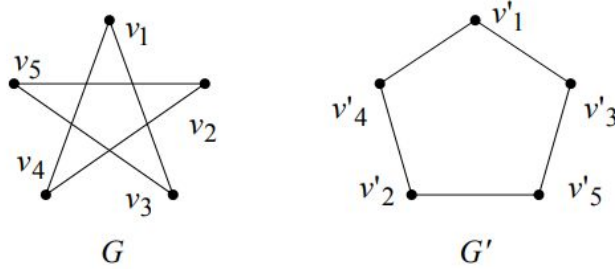


Questions for tutorial on graph and algebraic structures

Q1) Are the following two graphs isomorphic?



Q 2) How many edges must a planar graph have if it has 7 regions and 5 nodes. Draw one such graph.

Q 3) Suppose that a connected planar graph has 20 vertices, each of degree 3 into how many regions does a representation of this plan graph split the plane ?

Q 4) Show that the set $G = \{1,2,3,4,5,6\}$ is a group with respect to multiplication modulo 7.

Q 5) Consider the set $A = \{1, 2, 3, 4, 5, 6\}$ under the multiplication modulo 7.

(a) Find the multiplication table for the above

(b) Find the inverses of 2, 3 and 5, 6

(c) Prove that it is a cyclic group

(d) Find the orders and the subgroups generated by $\{3, 4\}$ and $\{2, 3\}$

Q 6) Consider the (2, 4) encoding function. How many errors will e detect ?

$$e(00) = 0000 \quad e(10) = 0110$$

$$e(01) = 1011 \quad e(11) = 1100$$

Q 7) Consider (3, 6) encoding function 'e' as follows.

$$e(000) = 000000 \quad e(001) = 000110 \quad e(010) = 010010 \quad e(011) = 010100$$

$$e(100) = 100101 \quad e(101) = 100011 \quad e(110) = 110111 \quad e(111) = 110001$$

Show that the encoding function e is a group code.