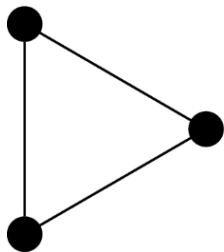


Problem 1 Draw the following graphs. Each graph is the same as another graph — find the pairs.

(a) K_2



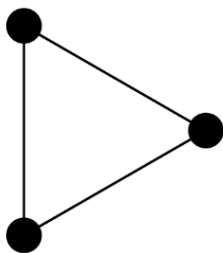
(b) C_3



(c) P_2



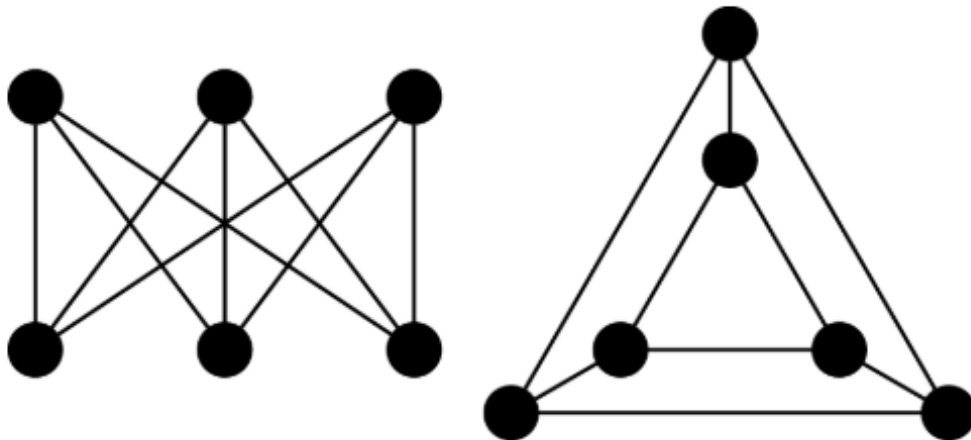
(d) K_3



Problem 2 There are n people at a conference, some of whom have shaken hands with each other. Model this situation with a graph, then prove that the number of people who have shaken an *odd* number of hands is even.

We construct a graph as follows: each person is a vertex and an edge is drawn between two vertices if those two people have shaken hands. By Theorem 11.6, there must be an even number of vertices (people) with odd degree (who have shaken an odd number of hands).

Problem 3 Consider the following two graphs. Prove that they are not isomorphic using either their *degree sequence* or *k-colorability*. That is, either show that they have different degree sequences or show that there is some k such that only one can be k -colored.



Both graphs are 3-regular, so every vertex has degree 3. However, the left graph is 2-colorable while the right graph is not (note that the triangle in the middle alone requires 3 different colors).