PSO sessions 1 and 2, week of April 27, 2020

PSOs 1 and 2

Problem 1. Graph K_n is the complete, undirected graph on n vertices.
(i) For what values of n does K_n contain an Euler cycle? Explain your answer.
(ii) For what values of n is K_n a bipartite graph? Explain your answer.

Problem 2. Let hypercube or n-cube graph Q_n be as described in `https://en.wikipedia.org/wiki/Hypercube_graph`.
(i) Q_n has 2^n vertices. How many edges does Q_n have?
(ii) Express the number of vertices and edges of Q_n in terms of the number and vertices of Q_{n-1}, respectively.
(iii) Is Q_n a bipartite graph?

Problem 3. A simple graph is regular if every vertex has the same degree.
(i) For which positive integers n are the following graphs regular: C_n, W_n, K_n?
(ii) For which positive integers m and n is the complete bipartite graph $K_{m,n}$ regular?