Math 4410 Discussion questions, Oct. 18, 2019

(1) Fix $n \geq 1$ and $k, 0 \leq k \leq n/2$. Prove there exists a bijection f from the k-subsets of $[n]$ to the $(n-k)$-subsets of $[n]$ such that $A \subseteq f(A)$ for all k-subsets A.
(2) Let G_n be the following graph. The vertices of G_n are the subsets of $[n]$. There is an edge between A, B if $|A - B| + |B - A| = 1$. We have seen that G_n is a bipartite graph with bipartition X equal to the subsets of odd cardinality and Y equal to the subsets of even cardinality. Find a complete matching of G_n. How many complete matchings of G_3 are there?
(3) Problem 6B from the text.