Math 6502 : HW # 2

All book problems are from Alon & Spencer, 4th edition.

(*) = required, (**) = optional, (***) = very optional / research problem

1. (*) Chapter 1. #7

2. (*) Chapter 1. #8

3. (**) Chapter 1. #6

4. (**) Let $F(n)$ denote the maximum number of Hamiltonian paths in a tournament on n vertices. What is the best upper bound you can come up with for $F(n)$? Note that $n!$ is a trivial upper bound. We showed in class the lower bound

$$F(n) \geq n! 2^{-(n-1)}.$$

5. (***) We showed in class that for every set A of n nonzero integers, there is a subset $B \subseteq A$ such that B is sum-free and $|B| > n/3$. Let $G(n)$ denote the largest number N such that every set of n nonzero integers contains a sum-free subset of size at least N. Is $G(n) - n/3$ bounded?