

Math 358-Week One Supplementary Exercises

Due September 9 in class.

1. Suppose that we have a standard 8×8 chessboard and that we remove a corner square. Can the resulting board be tiled by 1×3 tiles? Show how or explain why not?
2. Draw the complete graph on 6 vertices with as few crossings as possible.
3. Suppose that A is a non-empty finite set. Prove that A has as many even-sized subsets as it does odd-sized subsets.
4. Suppose that we have a staff of 20 students who want choose from among 15 work shifts. We need one student per shift, and no student may cover more than one.
 - (a) How many ways are there to cover the 15 shifts?
 - (b) How any arrangements are there in which only 10 of the 15 shifts are covered?
5. Suppose that we want to place 8 non-attacking rooks on a chessboard. In how many ways can we do this if the 16 most 'northwest' squares must be empty? How about if only the 4 most 'northwest' squares must be empty?