

## HOMEWORK 10: DUE IN CLASS ON TUESDAY, DECEMBER 6

One goal for this course is for you to develop your skill in effectively communicating mathematics. With this in mind, you should clearly write up your solutions. Solutions with little or no justification will receive little or no credit.

- (1) Suppose the Stony Brook soccer team plays 11 games during the season. In how many ways can the team win 5 games, lose 4 games, and tie 2 games.
- (2)
  - (a) How many ways are there to arrange 8 black rooks on a chess board, (so that no rook shares a row or a column with any other rook)?
  - (b) How many ways are there to do instead arrange 4 black rooks and 4 white rooks, under the same constraints.
- (3) Suppose you pick four cards from a standard deck of 52.
  - (a) What is the probability that you draw four aces?
  - (b) What is the probability that you draw exactly two aces in a row?
  - (c) What is the probability that you draw exactly black cards and exactly two kings?
- (4) Suppose you have six points in a plane, no three of which are collinear. In how many ways can you use the six vertices to make two distinct triangles. *Explain* your solution.
- (5) In class we discussed the question of determining a closed form for determining the possible number of monomial terms in a degree  $n$  polynomial with  $k$  variables. Finish this problem, and prove that your formula is correct.