UW Math Circle
October 17, 2013
Homework: Week 4

1. Suppose you cover a 100×100 checkerboard with non-overlapping squares whose side lengths are all odd integers. Show that the number of squares whose center square is white is equal to the number of squares whose center is black.

2. Hermione has five textbooks: Witchcraft, Wizardry, Potions, Care of Magical Creatures, and History of Magic.

   (a) In how many ways can Hermione arrange her textbooks?

   (b) How many ways if she wants to make sure that Witchcraft is the first book?

   (c) How many ways if she wants Witchcraft to be the third book?

   (d) In how many ways can she pick two of the books and arrange them on the shelf?

   (e) What if she just wants to put them in a bag?

   (f) What if she wants to pick some of the books and put them in a stack? (A stack can have 0, 1, 2, 3, 4, or 5 books)

3. How many ways are there to place a white bishop and a black bishop on a chessboard in a way that they cannot attack one another?

4. You're getting ready for Halloween and bought 3 types of candy: Snickers, Hershey's kisses, and Starbursts. How many different ways are there to give each trick-or-treater 3 pieces of candy? What if you want to give them 4 pieces? 5 pieces?