

Math 215 – Fall 2017

Practice Homework 18 – Assigned November 27th, due November 30th

**Note:** Remember that you must show your work to get full credit for a problem. This homework practices problems involving the Pigeon-Hole Principle and the Inclusion-Exclusion Principle. For ideas on how to get started please read Chapter 6 Section 5 and Chapter 7 Sections 1 and 2.

1. Suppose we have a deck of cards. Use the Inclusion-Exclusion Principle to find how many five-card hands contain at least one card of each suit.
2. How many ways can we rearrange the letters in “CATHAT” if no two of the same letters are to be next to each other?
3. Suppose you have an equilateral triangle made of paper which, in a fit of rage, you tear into tiny bits. If the original triangle was two meters on a side, show that if you choose five of the tiny bits of paper there are two bits which were originally no more than one meter apart in the triangle.
4. Suppose you have a set of 51 integers that lie between 1 and 100, including possibly 1 and 100. Show that there are two integers in your set which are relatively prime.