Math 215 – Fall 2017

Practice Homework – Assigned September 7th, due September 11th

**Note:** Remember that you must show your work to get full credit for a problem.

1. Compute the following expressions giving a single number as a result.

   (a) Compute P(6,1)

   (b) Compute P(100,2)

   (c) Compute P(6,4)

   (d) Compute C(6,4)

2. Suppose that there are 5 science classes, 6 math classes, and 7 computer science class you can take. You are required to take exactly four class such that you take at least 1 of each type of class. How many different class combinations are there?

3. Suppose you are given a standard deck of cards.

   (a) How many five card hands have at least one ace, but no more then three aces?

   (b) How many five card hands have at least three jacks and no more then one ace?

   (c) How many five cards hands have at least one heart or at least one diamond?

4. Suppose that you have 13 unmarked balls and 5 distinct boxes.

   (a) How may ways are there to place the balls into the boxes such that every box has at least one ball?

   (b) How may ways are there to place the balls into the boxes such that every box has at least two balls?

5. Suppose we have a cubic lattice of height 4, depth 4 and width 4. Then we can consider the front bottom left corner of the cubic lattice to be the origin and label it $(0, 0, 0)$. Then the 64 points on the lattice can be written as $(a, b, c)$ where $a$ is the number of units the point is to the right of the origin, $b$ is the number of units the point is above the origin, and $c$ is the number of units the point is behind the origin. An ant starts at the origin of the lattice and can only move to the right, up, and towards the back. How many ways are there for the ant to get to the point $(4, 4, 4)$?

6. Consider the same cubic lattice as above. How many paths can the ant take that do not go through the point $(2, 2, 3)$?