Math 215 - Assignment Number 2, Spring 2013

(A) Eccles. Page 53 - 55. Problems
1,2,
3
(in this problem you are allowed to make an evaluation. for example , letting A notand B = A#B,
T#P = ~(T ^ P) = ~P. in this way, # can be used to make ~.),
4, 5, 7, 8, 9, 10, 12, 16.

(B) Show that the following is a tautology using only algebra: (A--->B)v(B---->A).

(C) Prove that the square root of 5 is irrational.
Note that you will need to prove that if 5 divides n^2 then 5 divides n when n is a natural number. (In order to do this you need to know that every natural number is in one of the following forms for some natural number k: 5k, 5k+1, 5k +2, 5k +3, 5k + 4 or just 1,2,3,4. That is given a natural number it will leave a remainder of 0,1,2,3 or 4 upon division by 5.)

(D) Take the set of non-zero digits D={1,2,3,4,5,6,7,8,9}. Find all triples {a,b,c} of distinct digits such that a + b + c = 15. You will find that there are 8 such unordered triples. Arrange these eight triples in a 3 x 3 grid so that each row adds to 15, each column adds to 15 and the two diagonals also add to 15. This is the simplest known example of a magic square.
