Due Oct 15.

Problem 1 (Cryptarithmetic)**.** Find appropriate values for the letters in the Cryptarithmetic puzzles. When writing your solutions, try to write it similar to how we did them in class (refer to the lecture notes if you have forgotten).

$$\begin{array}{cccc} & A & B & C \\ + & A & B & C \\ \hline & B & D & E \end{array} \qquad \begin{array}{cccc} & A & B & C \\ + & B & D & D \\ \hline C & C & B & C \end{array} \qquad \begin{array}{cccc} & C & A & T \\ & C & A & T \\ & C & A & T \\ + & C & A & T \\ \hline & D & C & A \end{array}$$

Solution 1. 1. $A = 1$, $B = 2$, $C = 1$, $D = 4$, $E = 2$.

2. $A = 2$, $B = 9$, $C = 1$, $D = 0$.

3. $C = 2$, $A = 0$, $T = 5$, $D = 8$.

Problem 2 (Magic Squares)**.** (a) Find a 4 by 4 magic square (from the internet or otherwise) and show that it is a magic square.

(b) The 880 4 by 4 magic squares were determined in 1693. The 275305224 5 by 5 magic squares weren't determined until nearly 300 hundred years late in 1973. As of now, the number of 6 by 6 magic squares has not been determined. Explain why you think this problem is so difficult and why finding the number of 6 by 6 squares is practically impossible. (I'm really just looking for evidence that you thought about the problem for more than a couple of minutes.)

Solution 2. (a) Look online and do the appropriate computations (make sure rows, columns, diagonals add up to the correct thing).

(b) The issue basically comes from the many, many combinations possible for filling out a magic square of this dimension.

Problem 3 (Extra Credit)**.** (a) Prove that the magic number for 4 by 4 magics squares is 34 using a method similar to what we did for 3 by 3 magic squares.

Solution 3. Solution is basically provided in the notes.