Week 6 Lecture 2

October 4, 2017

- **Stretch 28 (Pg. 101):**
  - **Hint:** Make an assumption. If it is wrong, try a different assumption.
  - **Solution:** Assume A is the spy and B is the knight. A says that B is a spy (a lie, which is consistent). B (the knight) says that A is a knight – a lie and knights can't lie – contradiction. Now assume A is the knight and B is the spy. A (the knight) speaks the truth when he says B is the spy (consistent). B (the spy) says that A is the knight, but this is true and he must lie – contradiction. Thus A must be the peasant. Assume B is the spy and C the knight. A (the peasant) says that B is the spy. This is true and consistent. B (the spy) says that A is the knight (false and consistent). C (the knight) says that one of A or B speaks the truth, which is consistent since the knight does. So A is the peasant, B the spy, and C the knight.
- **Stretch 30 (Pg. 101):**
  - **Hint:** Guess and check.
  - **Solution:** The last digit must be even. Start by guessing the first digit and seeing if the last one can ever work. After a few tries you get each turkey cost $5.11 and 72 of them cost $367.92.
- **Ch. 6 Stir It Up - Section: Trial and Error**
  - **Cryptarithmetic (Pg. 58)**
    - Go over ELF+ELF example (fully solved in the book).
    - While these problems are generally Trial and Error, there are a few guidelines that get you going and minimize the guessing: 1) If the sum of two n-digit numbers is an (n+1)-digit number, then the first digit of the sum is 1, because the first digit of the sum is the result of a carry. 2) Once you work the left hand side, look at the right side for items that have to be even (like in ELF + ELF = FOOL, L must be even since L = twice F). 3) Some letters have only two possibilities based on whether the previous addition carried or not.
  - **More Cryptarithmetic (Pg. 116)**
    - 1. 981+110 = 1091;
    - 2. 89718+871 = 90589;
    - 3. 1663+9263 = 10926;

* 4. There are 12 different letters;
* 5. 7483+7455 = 14938;
* 6. 8967 + 67 = 9034 is one of six possible solutions, all with TH = 89;
* 7. 13656 = 7616;
* 8. 2197814 = 307692;
* 9. 242/303 - you can get the answer by simplifying TALK/9999.