

Week 6 Lecture 1

October 2, 2017

- **Stretch 26 (Pg. 101):**

- **Solution:** Start off by assuming sentence one is True. This leads to a contradiction since more than one sentence is false (Sentence 5 is false and Sentence 2 is false). Thus, sentence 1 is F. This makes sentence 5 True, so sentences 2 and 3 are either TT or FF. FF contradicts sentence 2 so they must be TT. By sentence 3, 4 is now True. Thus we get 1 is F and the rest are true.

- **Stretch 27 (Pg. 101):**

- **Solution:** There are many different magic squares, for example 816 as top row, 357 as middle row, 492 as bottom. Start by proving that each row/column/diagonal must add to 15 (since the whole square adds up to 45). Then prove the five must be in the middle (a low number like 1 in the middle creates a problem with where 2 will go. Since we can only go up to nine, we can never complete that sum to 15. A high number in the middle (like 9) causes a problem with putting 8 somewhere (you've already exceeded 15), so the middle square needs the middle number. From here on in, trial and error completes it.
- How many 3x3 magic squares are there? As many as there are ways to rotate a square. There are only 8 symmetries of a square.