MA 310 Homework #6

Due Wednesday, February 27

1. Solve "Five Houses." For this problem, you do not have to explain all of the steps in your reasoning, but simply provide a final list of the houses, indicating for each the color, nationality, pet, drink, and food.

2. Solve "Smith, Jones, and Robinson." You don't have to explain all of the logical steps, but sketch your approach and state the final solution.

3. Solve "Consecutive Numbers," parts (1) through (4). Justify your answers.

4. Solve "How Many Children?" Justify your answer.

5. Use "logic flow charts" (which we will discuss in class Friday) to solve these two problems:

   (a) Find the set of all real x satisfying $|5 - x| \leq 6$.

   (b) Find the set of all real x satisfying $|x + 3| > 10$.

6. Here is a "proof" that if a, b, c are real numbers such that $a + b = c$, then in fact $a = c$:

$$\begin{aligned} a + b &= c \\ (a + b)(a - c) &= c(a - c) \\ a^2 - ac + ab - bc &= ac - c^2 \\ c^2 - ac - bc &= ac - a^2 - ab \\ c(c - a - b) &= a(c - a - b) \\ c &= a \end{aligned}$$

   What are the mistakes in this reasoning?