HW 1-1 (Due Aug. 25, 2016) **Name:**

Problem 1. Suppose that A and B are two events. Write expressions involving unions, intersections, and complements that describe the following:

1. Both events occur
2. At least one occurs
3. Neither occurs
4. Exactly one occurs

Problem 2. suppose a family contains two children of different ages, and we are interested in the gender of these children. Let F denote that a child is female and M that the child is male and let a pair such as FM denote that the older child is female and the younger is male. THere are four points in the set S of possible observations:

$$S = \{FF, FM, MF, MM\}.$$

Let A denote the subset of possibilities containing no males; B, the subset containing two males; and C, the subset containing at least one male. List the elements of A, B, C, $A \cup B$, $A \cap B$, $A \cup C$, $A \cap C$, $B \cup C$, $B \cap C$, and $C \cap \bar{B}$.

Problem 3. Define the sequence of sets $A_j = (1 - 1/j, 2 + 1/j)$, for $j = 1, 2, \ldots$. Then what are

$$\cup_{j=1}^{\infty} A_j \text{ and } \cap_{j=1}^{\infty} A_j?$$