PS 2703
Problem Set 1
Due Monday, Sept. 10

1. Prove the distributive law $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.

2. Construct a set of pairwise preference relations on $X = \{a, b, c\}$ that are complete and quasi-transitive but not transitive. Show (prove) that your preferences satisfy the desired properties. What is M(R,X)?

3. Show that if R is complete then for any two alternatives x and y one and *only one* of the following relationships must be true: xIy, xPy, yPx.

4. (This is an extension of McCarty and Meirowitz 2.2.) Suppose that the weak preference relation R is transitive ($\forall\ x, y, z \in X, xRy \wedge yRz \Rightarrow xRz$). Prove the following:

   a. The indifference relation I is transitive: ($\forall\ x, y, z \in X, xIy \wedge yIz \Rightarrow xIz$)
   b. $\forall\ x, y, z \in X, xIy \wedge yPz \Rightarrow xPz$
   c. $\forall\ x, y, z \in X, xPy \wedge yIz \Rightarrow xPz$

5. Osborne, Exercise 5.3

6. Osborne, Exercise 6.1