Problem Set 1   Real Analysis 1   Due 9/6/2002

Each problem is worth 3 points. Adequate demonstration is required for full credit.

1. Are parentheses necessary in the expression A ∪ B ∩ C? That is, is (A ∪ B) ∩ C the same as A ∪ (B ∩ C) for all sets A, B, and C?

2. In a recent study of 650 first-year students at a large state university, it was found that after one week:

      310 were still clueless.

      356 were involved in new amorous relationships they swear will be life-long.

      328 had already contacted their parents to ask for more money.

      180 were clueless and involved in relationships.

      147 were clueless and had contacted their parents for money.

      166 were involved in relationships and had contacted their parents for money.

      94 were clueless, involved in relationships, and had contacted parents for money.

How many for the students studied were not clueless, not involved in relationships, and had not yet asked for money?

3. What can be said about a composition of two odd functions?

4. If both functions f:A→B and g:B →C are surjective, prove that g∘f:A→C is surjective.

5. Use mathematical induction to prove that $n^2 + n$ is even for all n∈ℕ.

6. Use mathematical induction to prove that $5 + 8 + 11 + ... + (3n+2) = \frac{1}{2}(3n^2 + 7n)$ for all n∈ℕ.