1. Consider the set A = {1, 2, a, b}, and B = {1, 3, b, c}. Write the set A – B, A ∩ B. Write the power set of P(A ∩ B).

2. Prove using the set builder notation $\overline{(A-B)\cup B} = \overline{A}\cap\overline{B}$, where *A* and *B* are sets.

3. Let T(x,y) means “y teaches x”. Express: (a) for every student there is a teacher; and (b) every student is taught by more than one teacher.

4. Show that $(p\wedge q)\rightarrow(p\vee q)$ is a tautology.

5. Write the prime factorization of 223079.

6. You are given the sequence a_{10} = -10, a_{11} = -12, a_{12} = -14. Find the sum $\sum_{k=100}^{150} a_k$.

7. Find the formula for $\sum_{k=1}^{n}\sum_{j=k+1}^{m}(j-k)$.

8. Find the formula for $1+r^2+r^4+\cdots+r^{2n}$.

9. Prove that the sum of two odd integers is even.

10. Show that the square of any integer is of the form 3*k* or 3*k* + 1.