Staple this assignment sheet to your solutions

1. Using induction on the size of S prove \( |2^S| = 2^{|S|} \) for a finite set S. That is the cardinality of the power set of S (i.e. \( |2^S| \)) is 2 raised to the cardinality of S (i.e. \( 2^{|S|} \)).

   Explicitly show base case, state (and label) the induction hypothesis and induction step (what you’re trying to prove), and give the proof.

   Hint: If \( S = \{x_1, x_2, ..., x_n, x_{n+1}\} \), let \( S' = S - \{x_{n+1}\} \). Use the fact that subset of S either contain \( x_{n+1} \) or do not contain \( x_{n+1} \) and that there is a natural one to one correspondence between these sets.

2. In class on Monday we gave (or started) the set proof for the DeMorgan’s Law for Sets: \( A \cup B = \overline{A \cap \overline{B}} \). Using this proof to guide you give the proof for the other DeMorgan’s Law for Sets: \( A \cap B = \overline{A \cup \overline{B}} \).