CS 361 – Homework 1

Total possible points: 30

1. (17 points) Let A ={(x), (y), ()} and B ={(x), (y)}
   a. Is A a subset of B?
   b. Is B a subset of A?
   c. What is $A \cup B$?
   d. What is $A \cap B$?
   e. What is $A \times B$?
   f. What is the power set of A?
   g. What is $\overline{A \cap B}$?

2. (5 points) Find the error in the following proof that 2 = 1.
   Consider equation $a = b$. Multiply both sides of a to obtain $a^2 = ab$. Substract b^2 from both sides to get $a^2 - b^2 = ab - b^2$. Now factor each side, $(a + b)(a - b) = b(a - b)$, and divide each side by $(a - b)$ to get $(a + b) = b$. Finally, let a and b equal to 1, which shows that 2 = 1.

3. (8 points) Let *w* be a string over an alphabet Σ. **Prove** that $(w^i)^R = (w^R)^i$, where *R* is the string's reverse operation and $i \geq 0$ is the string's repetition operation.