Before beginning this homework assignment, please review the guidelines for submitting homework. Please write down the total amount of time spent working on the assignment at the top of what you turn in. Remember that at least one problem from each assignment must be written in \LaTeX.

1. **COUNTABILITY (One, two, three, ha ha ha !)**

We are now moving into applying the concepts of cardinality to infinite sets. We’ll see a number of surprising results and ultimately be able to prove the existence of the elusive transcendental numbers.

   (1) Prove Theorem 8.2.16.

   (2) Prove Theorem 8.2.17. (Hint: construct a bijection from \( \mathcal{P}(X, Y) \) to a subset of \( X \times Y \). Use 8.2.16 and 8.2.6.)

   (3) Spend time working carefully through the proofs in Section 8.2 of the text. Email me one or two questions or points of confusion.