Math 2001: Homework P2

Due: September 9, 2009

1. Consider the set of positive integers which give a remainder of 3 when divided by 4. Give two different descriptions of this set using set-builder notation.

2. From the book do problems:

    (a) 1.2.2 (Section 1.2, problem 2)
    (b) 1.2.7

3. Give examples of the following, or explain why they do not exist.

    (a) An infinite set with a finite number of subsets,
    (b) A finite set with an infinite number of subsets,
    (c) A finite set with the same number of subsets and elements.

4. Let A be a set, and let $B = P(A)$ be the power set of A. Is $A \in B$ or $A \subseteq B$? Justify your answer.

5. What is the number of subsets of the set $\{\{1, 2, 3\}, \{1\}, \{1, 4\}, \{1, 4, 5, \{1, 2\}\}, \{1, 2, 3, 4\}\}$?

6. What is the number of subsets of $\{a, b, c, d, e, f\}$ which all contain c? Generalize by determining how many subsets of $\{1, 2, \ldots, n\}$ contain 1.