MAT 511 Fundamental Concepts of Math

Problem Set 6

due Thursday, Oct 23

Please prove all your answers. Short and elegant proofs are encouraged but not required.

Problem 1. (a) List all subsets of the set $S = \{1, \emptyset, \{\emptyset\}\}$. Here $\emptyset$ stands for the empty set, as usual.
(b) The *power set* $\mathcal{P}(A)$ of a given set A is the set of all its subsets. (Read about the power set in the textbook, p.74–75.)

Suppose that the set A has n elements (n is a natural number.) Use induction to prove that the power set of A has 2^n elements.

(This is Theorem 2.4 in the book, and the proof given there uses material from section 2.6 which we didn't cover. I'm asking you to use induction instead; a proof taken from textbook will receive no credit.)

Please also do questions 11, 19abdfg from section 2.1, and questions 10b, 11ab, 12cde from section 2.2.