Name: ______________________________

Math 166 - Theory of Computability - Winter 1999

"Pop" Quiz #2

1. Write out these sets explicitly (by listing all their elements).
   2^X denotes the powerset of X. Use (x, y) notation for ordered pairs.

   (a) $2^{\emptyset} \quad =$

   (b) $2^{\{\emptyset\}} \quad =$

   (c) $2^{\{a,b\}} \setminus \{a, b, \{a\}\} \quad =$

   (d) $\{a, b\} \times \{c\} \quad =$

   (e) $\{a, b\} \times \{\{c\}\} \quad =$

   (f) $\{a, b\} \cup (\{b, c\} \cap \{a, c\}) \quad =$

   (g) $(\{a, b\} \cup \{b, c\}) \cap \{a, c\} \quad =$

2. Indicate whether the statements are true or false:

____(c) Caterpillars have wings if dogs have wings.

____(c) Butterflies have wings only if caterpillars have wings.

____(c) For all sets A, if $\emptyset \in 2^A$, then A is empty.

3. Describe the following sets in English: ($\mathbb{N}$ is the set of non-negative integers.)

   (a) $\{n \in \mathbb{N} : n \text{ is greater than each prime in } \mathbb{N}\}$

   (b) $\{n \in \mathbb{N} : n \text{ is greater than some prime in } \mathbb{N}\}$