Name: _____

Math 166 - Theory of Computability - Winter 1999

Quiz #1 — January 14

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. "$\setminus$" is "set minus".

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

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

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

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

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

2. Indicate whether the statements are true or false:

____(a) For all a, b, (a, b) is equal to (b, a) only if $a = b$.

____(b) For all a, b, $\{a, b\} = \{b, a\}$ only if $a = b$.

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

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

   (a) $\{n \in \mathbb{N} : n \geq k \text{ for some } k \text{ in } \mathbb{N}\}$

   (b) $\{n \in \mathbb{N} : n \geq k \text{ for all } k \text{ in } \mathbb{N}\}$