Math 166A - Theory of Computability - Fall 1999
Pop Quiz #1

1. Indicate whether the following are true or false:
($\mathcal{P}(X)$ denotes the powerset of X and '$-$' is 'set minus')

F (a) $\emptyset \in \emptyset$

T (b) $\emptyset \subseteq \emptyset$

T (c) $\emptyset \subseteq \{\emptyset\}$

T (d) $\emptyset \in \{\emptyset\}$

T (e) $\{a, b\} \subseteq \{a, b, \{a, b\}\}$

T (f) $\{a, b\} \in \{a, b, \{a, b\}\}$

F (g) $\{a, b, \{a, b\}\} - \{a, b\} = \{a, b\}$

F (h) $\{a, b\} \subseteq \mathcal{P}(\{a, b, \{a, b\}\})$

T (i) $\{\{a, b\}\} \in \mathcal{P}(\{a, b, \{a, b\}\})$

2. Which of the following are true statements?

T (a) Dogs can fly if horses can fly.

T (b) Cats can fly only if birds can fly.

F (b) Birds can fly only if cats can fly.

T (c) If cats can fly then birds can fly.

3. Let $\mathbb{Z}$ denote the set of integers. Describe, as simply as possible, the following sets in English:

(a) $\{2k : k \in \mathbb{Z}\}$ ANS: The set of even integers.

(b) $\{4n : n \in \mathbb{Z}\} \cup \{4n + 2 : n \in \mathbb{Z}\}$ ANS: The set of even integers.

(c) $\{4k : k \in \mathbb{Z}\} - \{2k : k \in \mathbb{Z}\}$ ANS: $\emptyset$ (the empty set).

(d) $\{n : n = 2k \text{ for some } k \in \mathbb{Z}\}$ ANS: The set of even integers.

(e) $\{n : n = 2k \text{ for all } k \in \mathbb{Z}\}$ ANS: $\emptyset$ (the empty set).