

# Problem Set 7

## Recursion Theory

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**Due November 9, 2005**

[CT] is *Computability Theory* by Barry Cooper.

1. Prove that if a model  $\mathfrak{M}$  of **PA** contains a nonstandard element  $\gamma$ , then it contains  $\gamma - n$  for each natural number  $n$ . (**Hint: find a theorem of PA stating this fact**).
2. Prove that  $C = \{x \mid \exists y (x \in W_y \text{ and } y \in W_x)\}$  is creative.
3. Exercise 7.1.6 on page 103 of [CT].