**Assignment #4 Key; Due February 13 at start of class**

Choosing from among **(REC)** **recursive**, **(RE)** **re non-recursive, (coRE) co-re non-recursive**, **(NRNC)** **non-re/non-co-re**, categorize each of the sets in a) through d). Justify your answer by showing some minimal quantification of some known recursive predicate.

**a.) { f | domain(f) is infinite }**

 NRNC

 **Justification: ∀x ∃<y,t> [ y≥x & STP(f,y,t) ]**

**b.) { f | |range(f)| = 1 }**

 NRNC

 **Justification: ∃ <x,t> ∀ <y,t’> [ STP(f,x,t) &&**

**(STP(f,y,t’) ⇒ (VALUE(f,y,t’) = VALUE(f,x,t))) ]**

**c.) { <f,x> | f(x) converges in at most 2\*x+1 steps }**

 REC

**Justification: STP(f, x, 2\*x+1)**

**d.) { f | domain(f) converges in at most 2\*x+1 steps for all input x }**

 coRE

**Justification: ∀x STP(f, x, 2\*x+1)**