

Assignment #5; Due February 26 at start of class

1. Consider the set of indices **SemiConstant** = $SC = \{ f \mid |\text{range}(\varphi_f)| = 1 \}$.
2. Using **STP**, **VALUE** and a minimum number of alternating quantifiers, describe the set **SemiConstant**.
3. Show that $TOT \leq_m \text{SemiConstant}$, where $TOT = \{ f \mid \forall x \varphi_f(x) \downarrow \}$.
4. Show that $\text{SemiConstant} \leq_m TOT$, where $TOT = \{ f \mid \forall x \varphi_f(x) \downarrow \}$.
5. Use Rice's Theorem to show that **SemiConstant** is not recursive (not decidable). Note that members of **SemiConstant** do not need to converge for all input, but they must converge on at least one input and when they do converge they always produce the same output value. Hint: There are two properties that must be demonstrated.