1. What properties does program $I$ need to have for $I$ to be an interpreter (for the programming language that has been chosen as the standard one for programs)?
2. Consider the following definition of a ``semi-computable'' language over alphabet $Σ$. For any program *p*, define Acc(*p*) = {x | Run(p,x) $≅$ 1}. Say that language *A* is semi-computable if there exists a program *p* where Acc(*p*) = *A*.

Is the definition of a semi-computable language equivalent to the definition of a computable language? That is, is it true that *A* is computable if and only if *A* is semi-computable? Justify your answer.

1. Let *A* be the decision problem:

**Input.** Two FSMs $M\_{1}$and $M\_{2}$, both with alphabet $Σ$.

**Question.** Is $L\left(M\_{1}\right)∪L\left(M\_{2}\right)= Σ^{\*}$?

 Show that *A* is computable.

1. Let *B* be the following decision problem:

 **Input.** A polynomial *p* of degree 3 with integer coefficients in a single variable, *x*.

 **Question.** Does there exist a value of *x* for which *p* = 0?

 Show that *B* is computable.

1. Let INFINITE be the following decision problem

**Input.** A FSM *M*.

**Question.** Does *M* accept infinitely many strings?

Show that INFINITE is computable. It is not necessary to go into details about how to solve clearly solvable problems about graphs.