1. What properties does program need to have for 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 . 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 and , both with alphabet .

**Question.** Is ?

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.