Math 6010 - Assignment 4

Due September 23, 2015

(15) Let P, Q be decision problems with $P \leq Q$. Prove:

If P is not recursively enumerable, then Q is not recursively enumerable.

(16) Reduce the Halting Problem for Turing machines to the Acceptance Problem to show that the latter is not decidable.

Is the Acceptance Problem reducible to the Halting Problem?

(17) Show that the problem whether Turing machines M_1, M_2 accept the same language is undecidable.

(18) Is the set of Turing machines that accept the empty language

$$\{\langle M \rangle \mid L(M) = \emptyset\}$$

recursively enumerable?

(19) Show that the set of codes for Turing machines that write some nonblank symbol eventually when started with empty input is decidable.

What about machines that write the letter 0 sometime after starting on an empty tape?