Ma 236 Sample Problems

May 11, 2017

The Ma 236 final exam will contain problems like the ones on the homework assignments and the midterm exam. Here are some other sample problems.

1. Translate into symbolic form "Alma only eats at restaurants where all truckers eat".
2. Write out the truth table for "unless".
3. Estimate the Kolmogorov complexity (in terms of n) of the first n digits of
$$\sqrt{2} = 1.41421356237309504880168872420969807856967187537694807 3\ldots$$
Hint: There is a program which prints out the decimal expansion of $\sqrt{2}$.
4. Translate "No number is both even and odd" into symbolic form using the language of arithmetic.
5. Construct a model of Robinson arithmetic in which there is a number which is both even and odd.
6. Use induction to prove that in the standard model of arithmetic no number is both even and odd.
7. Define what it means for a word to be incompressible.
8. Define what it means for a subset of N to be computably enumerable, and give an example of a computably enumerable subset of N.
9. Summarize what you have learned about N in this course.
10. True or false?
    (a) A computably enumerable set is always computable.
    (b) If the tree method terminates, then the sentences are consistent.
    (c) An argument with no premises is never valid.
    (d) $\exists x\, x = a$ is a tautology.