Homework #5

• Homework from the book

  – Section 1.7 (p.66) #8, 9, 10, 11
  – Remember our definition of effective is an informal notion, so your proofs may be informal. See me for questions.
  – #9 is now extra credit. Also, recall dom $B = \{\alpha \mid \langle \alpha, n \rangle \in B\}$. This notation is usually used when $B$ represents a function, but it works in the general case.
  – For 10 (b), think what happens if both $\Sigma \models \tau$ and $\Sigma \models \neg \tau$. What does that say about the consistency of $\Sigma$? What does that say about the things that tautologically follow from $\Sigma$?

• Other homework

  1. Prove that the equinumerous relation $\sim$ is an equivalence relation. A definition of $\sim$ can be found in the lecture notes and in Chapter 0 of the book. If you use any facts about one-to-one functions, prove them using the definition of a one-to-one function. For example, if you need the fact “if $f$ and $g$ are one-to-one, then so is $f \circ g$” then you should prove it. (This is to make sure you are familiar with working with such concepts.)

  2. Prove that $A \preceq B$ iff there is a function $f : B \to A$ which is onto. (Notice this is different from the definition we gave you in class and in Chapter 0 of the book.)

  3. Write down a proof that $\{0, 1\}^\infty$ is not countable which was given in class.

  4. Write down a proof that $\mathcal{P}(A) \not\preceq A$ which was given in class. (Actually I gave a proof that $\mathcal{P}(A) \not\sim A$, but the proof really showed that $\mathcal{P}(A) \not\preceq A$. It may be helpful to use (2).)