Remarks on the 2014 Model Theory exam

February 4, 2014

Firstly, many apologies for the typo in question 2 ("$\pi(r_i) = \pi(s_i)$" should have been "$\pi(r_i) = s_i$"). Fortunately this was spotted by several students and was announced in the main exam room early on. It doesn't seem to have affected the answers and this question was quite well done. It turned out, however, that the Exams Office did not inform the one candidate in the other room, so I marked his answer as sympathetically as I could.

Question 1 was also very well done, as was the bookwork in question 3. For the last part, however, most students reverted to quoting Ryll-Nardzewski rather than deducing the result from the previous part, which is what was demanded here. I gave only one or two marks for this (out of four).

Almost all candidates made their choice between questions 4 and 5. There was some shaky combinatorics in answer to question 4 and only half the attempts saw their way through to the end. The point is that the set of sentences in part (c) determines which sentences hold almost surely (option 1 in part (d))-namely those that are logical consequences of this set. Since the set is complete, if a sentence ϕ is not such a logical consequence, then its negation is, and an easy computation shows that if $\neg\phi$ satisfies option 1 in (d) then ϕ satisfies option 2.

Question 5 was suprisingly well done considering that the material comes right at the end of the course. Just one thing to watch though: when forming the diagram, one must introduce new constants (and here the same constants are used for the elements of the structure $\mathfrak{A}$ whether they are being considered in A or in B) and not keep variables in the formulas. For example, the logical consequence relation does not make sense for formulas (at least, as I have approached it in this course).