Math. 467 (Fulling) May 2011

Final Examination – Take-Home Part

We have taken it more or less for granted that the real Cartesian plane, $\mathbf{R}^2$, is a model for all the Hilbert axioms. Your task is to write a good essay proving that it does satisfy four of the axioms:

I-1, B-3, C-1, C-5.

For crucial definitions, see pages 118 and 139 of Greenberg's book (and use the index to find other relevant pages). If you don't like his definition of congruence of angles, you may define it from the vector dot product:

$$\mathbf{u} \cdot \mathbf{v} = |\mathbf{u}||\mathbf{v}| \cos\theta$$

where

$$\theta = (\angle \mathrm{BAC})^\circ, \qquad \mathbf{u} = (b_1 - a_1, b_2 - a_2), \quad \mathbf{v} = (c_1 - a_1, c_2 - a_2).$$

This is an open-book examination: You may consult Greenberg's textbook, your notes, and the lecture notes on our web page. You may NOT consult the books by Hartshorne and Borsuk–Szmielew mentioned by Greenberg on p. 139. You may consult other books in the TAMU library but not check them out (and you should footnote any directly pertinent information you get from them). But while you are working on the test, you should not discuss it with other human beings (with or without intervening electronic media) nor use Web search engines. Even after finishing, you must not mention it among students who may not have done so.

Turn in your essay at Blocker 620H before 5:00 p.m. on Friday, May 6.