



KENT PEARCE

“Use of Computer Technology for Insight and Proof: Strengths, Weaknesses and Practical Strategies”

9/24/2010, 192 PB

Abstract: We will consider the capability and role of computer algebra systems (CAS) in constructing proofs – in particular in “proving” inequalities. Can you (your calculator or your computer) ever draw a graph and deduce from the drawn graph that you have a proof of an inequality? We will conclude that there is a role for CAS in analysis and, specifically, that there are various useful and practical strategies for rigorously establishing analytic inequalities.



KEITH MELLINGER

“Kirkman’s Schoolgirls Wearing Hats and Walking through Fields of Numbers”

10/15/2010, ED 172

Abstract: The Kirkman schoolgirls problem, a famous gem due to T. P. Kirkman in the mid 19th century, asks for 7 distinct arrangements of 15 girls into 5 rows of 3 girls each, assuming that each girl walks in a row with every other girl exactly once. Solutions to this famous problem can be found in algebraic number fields, finite projective 3-space, and certain error-correcting codes. We will discuss each of these areas, discover the connections, and explain the underlying mathematical objects.



ALISSA CRANS

“Quandles, Braids, and Tangles, oh my!”

11/12/2010, ED 172

Abstract: While it may sound surprising, algebra and topology actually have a very close relationship! One way to demonstrate this connection is through the language of quandles. A quandle is a set equipped with two binary operations which satisfy identities that are closely related to the properties satisfied by the operations of left and right conjugation. After examining examples of quandles, we will illustrate their connection to knot theory, and in particular, to the three Reidemeister moves. We will also explore the method which enables us to associate a quandle to a given knot. Finally, we will answer the question, Why should we even care about these things called quandles?