

1046-X1-1590

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Papers and Oral Examinations to Deepen Students Understanding of Calculus.*

Students write four papers, based on questions similar to the released free-response questions of previous AP exams. Topics include such things as methods of finding solids of revolution, relationships between graphs, derivatives and integrals, Riemann sums, definite integrals, and first and second derivatives. The papers require that students think deeply about the underlying calculus principles. They must describe these concepts in their own words and show a step-by-step solution to each problem that involves these topics.

An oral examination of each student is conducted by a panel of three outside experts. The panel includes retired teachers, engineers, and other professionals from the community. The panel chooses a paper from among the four previously prepared, and poses questions to the student to assess his/her understanding. Having to communicate their understanding of calculus to unknown adults in a formal setting requires good communication skills and thorough preparation.

Students report benefits to this process: They solidified their understanding prior to the AP exam. They applied the oral communication skills to other areas (job interviews, professor contacts, etc.) They referred to their papers when they took Calculus 2 or 3 at the university. (Received September 16, 2008)