Scholarship

2009 Assessment Report

Mathematics with Calculus

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COMMENTARY

This examination assessed knowledge of Level 3 Mathematics with Calculus with respect to the *Scholarship (Mathematics with Calculus) Performance Standard.* Several parts of questions in this examination required candidates to demonstrate the "Outstanding Performance" descriptor, (e.g. "independently develop an extended chain of reasoning", "show insight and flair" and "demonstrate a high level of conceptual understanding").

The first part of each question was relatively accessible, requiring some initial set-up of the problem or basic insight. Beyond that, because candidates were required to demonstrate that they could develop an extended chain of reasoning, questions were not overly structured or scaffolded. That is, the method of approach was not provided, since finding a suitable method is one of the abilities being examined, along with the use of a combination of techniques and concepts. Several questions crossed strands of the curriculum, or posed questions in less than straightforward ways. Such questions were not answered well by the majority of candidates.

The best performing candidates wrote insightful responses, sometimes successfully approaching questions from directions that were unanticipated by the examiner. These candidates produced work that was a pleasure to assess. The top five candidates in particular were imaginative, resourceful and concise in their responses. They wrote lucid, well-formed answers through which they showed clearly their reasoning processes.

SCHOLARSHIP WITH OUTSTANDING PERFORMANCE

Candidates who were awarded Scholarship with Outstanding Performance typically:

- showed insight and flair in their responses
- wrote responses which clearly illustrated their chain of reasoning
- supported their responses with brief supplementary or explanatory comments
- manipulated algebraic and trigonometric expressions succinctly
- demonstrated understanding of how components of the curriculum are related
- worked confidently on the more difficult last part of most questions.

SCHOLARSHIP

Candidates who were awarded Scholarship but not Scholarship with Outstanding Performance commonly:

- readily found methods of solution
- purposefully manipulated algebraic and trigonometric expressions
- simplified where appropriate in the middle of an extended chain of algebraic work
- showed they had checked that their answers were correct or valid with respect to the question or context
- self-corrected errors in working
- drew diagrams to assist their working and support their responses
- dealt with new contexts confidently
- demonstrated sound knowledge of all components of the curriculum.

OTHER CANDIDATES

Candidates who were not awarded Scholarship or Scholarship with Outstanding Performance commonly:

- did not effectively combine knowledge from different strands of the curriculum
- did not show understanding of what a question called for
- made careless algebraic errors, particularly with exponents and signs
- developed meandering algebraic manipulations without evidence of a clear goal
- did not show understanding of the relationships between variables involved
- wrote repeated variations of an answer to a question
- did not make the necessary geometric connections
- did not show understanding of definite integration limits
- did not show understanding of roots of unity
- did not properly demonstrate the nature of ‘proof’
- did not show familiarity with the notion of continuity of a function.