

# **Assessment Report**

## **Scholarship, 2008**

### **Calculus**

## COMMENTARY

The results showed the standard of the examination to be similar to that set in 2008, but there were quite a few better top scripts. The 2008 paper produced a good spread of results, as well as clearly distinguishing the top candidates. A considerable number of candidates continue to be poorly prepared for work at this level. Overall the presentation was good, with fewer cases of pencil being used (candidates need to be aware that the work done in pencil cannot be considered in a reconsideration).

### **The best-performing candidates most commonly demonstrated the following skills and/or knowledge:**

- strong algebraic manipulation skills
- strong differentiation and integration skills, such as for related rates, parametric differentiation and solutions of differential equations
- good understanding of rules of logarithms and trigonometric manipulations
- ability to work with trig ratios, fractions, and surds etc in order to obtain exact solutions
- ability to work with and manipulate complex numbers in a variety of different formats and to apply de Moivre's theorem
- ability to make good use of diagrams to enable visualisation of problems, and hence used symmetry and other transformation principles based on such diagrams
- appropriate early simplification in their work when solving a problem
- recognition of the relevance of earlier parts of questions to later parts, and the ability to see how to apply them
- ability to use, and to translate between, parametric and Cartesian forms of functions, including conic sections
- ability to reason carefully, to write a mathematical argument and to apply appropriate mathematical principles, especially to novel situations.

### **Candidates who did NOT achieve scholarship lacked some or all of the skills and knowledge above and in addition they:**

- did not read questions carefully enough
- had poor algebraic skills
- got involved in lengthy, and often unnecessary, algebraic manipulation
- could not write correct mathematical statements
- made wrong assumptions about the relationship between question parts
- resorted to decimals and calculators early on in questions, even when exact answers were expected
- did not make use of graphs and diagrams to help them with problems
- did not understand "rate" as meaning change with respect to time
- were unable to use the binomial expansion
- could not apply the factor theorem.