Mathematics: Specialist Mathematics GA 1: Unit 3 and 4 Coursework

Unit 3 Coursework

GENERAL COMMENTS

The tasks to be undertaken by students for school-assessed coursework in Specialist Mathematics Unit 3 are specified on page 164 of the VCE Mathematics Study design. These tasks must be part of the regular teaching and learning program, and completed mainly during class time under the supervision of the teacher. Additional advice to assist teachers is included in the 'Advice for Teachers' section of the study design, as well as in the Mathematics Assessment Guide Revised VCE 2001.

For Unit 3 students are required to complete two analysis tasks in order to demonstrate achievement of the three outcomes. The student should be able to:

- define and explain key terms and concepts, as specified in the content from the required areas of study, and apply a range of related mathematical routines and procedures
- apply mathematical processes in non-routine contexts and analyse and discuss these applications of mathematics
- select and appropriately use technology to develop mathematical ideas, produce results and carry out analysis in situations requiring problem-solving, modelling or investigative techniques or approaches.

Each analysis task must be completed mainly in the classroom and within a limited timeframe. Each task should be a short item of 2–4 hours duration over 1–2 days.

Teachers must select **two** of the following four types of task:

- **An assignment where students have the opportunity to work on a broad range of problems**
  Teachers and students used this task as an opportunity to review and revise a number of topics in the one piece of work. It is important to ensure that the answers to the problems set required analysis and discussion and not just the production of results.
- **A short focused investigation, challenging problem or modelling task**
  Many teachers successfully developed tasks that drew on ideas and approaches from previous CAT 1 problem solving tasks. It is important that students not be expected to complete in two or three hours what was previously completed over two weeks.
- **A set of application questions requiring extended response analysis in relation to a particular topic or topics**
  Many teachers successfully adapted questions from previous CAT 3 analysis papers, although questions should not be used verbatim as the course has undergone significant change in the last decade. It is important to ensure that past questions are still relevant to the current course, and that new content is not overlooked. The set of questions should be linked to the topic/s in an independent and coherent way, rather than presenting a collection of discrete questions.
- **Item response analysis for a collection of multiple-choice questions**
  Students were most successful with this task when the teacher provided a framework for the student responses. A tabular format, with a clearly indicated space for the correct response and working along with spaces for the reasons for rejecting each of the incorrect responses, elicited the best work from students. While this type of task was generally better implemented than in 2000, some teachers still set multiple-choice tests rather than analysis tasks. Such tests do not meet the assessment requirements, neither as analysis nor in length of task, and were unlikely to enable students to demonstrate achievement of Outcome 2.

Topics typically covered in the analysis tasks indicated that most teachers were following the teaching sequences indicated in pages 168–169 of the study design. Schools must ensure that the tasks set allow students to demonstrate all three outcomes and not just Outcome 1. The judgment for satisfactory completion of a task is based on student demonstration of achievement of the set of outcomes for the unit. The tasks should be set so that there is ample opportunity for students to carry out extended response analysis and to use appropriate technology.

Student responses

The student work submitted was generally of a high standard. The quality and presentation of the work may not be as polished as in previous years but this is to be expected given the changed nature and the reduced scope of the tasks and the earlier timing of the assessment.

Student responses indicated increasing use of the graphics calculator in coursework assessment and less frequent computer usage. It is important that students be required to provide a record of the processes from the calculator and, through discussion, display an understanding of the mathematics involved. For example, students should sketch the curve/s from the calculator and indicate the features of the graph/s being used to provide the answer.

Some students demonstrated a general knowledge of the basic concepts and skills but little understanding of how these were applied in broader contexts. Such students would likely have difficulty on components of tasks related to Outcome 2.

Assessment

Most schools interpreted the study design correctly and used appropriate assessment tools for Unit 3.

Schools are advised to ensure there is appropriate documentation relating to each task. This should include:

- the conditions under which the task is conducted, such as a cover sheet with instructions for students detailing time allocated, number of questions to be answered, support material which the students may use and type of response required
- the task set
- the marking scheme showing how marks are to be allocated and how the assessment criteria apply to the three mandatory outcomes.

Mapping of the outcomes with respect to components of tasks is needed for both the preparation of the task and the marking. This ensures that appropriate and sufficient opportunities for demonstrating all outcomes have been included.

It is important that schools choosing not to use the assessment criteria supplied by the VCAA in the Assessment Guide Revised VCE 2001 have detailed information about their tasks and how they have been assessed, particularly with respect to student opportunity for demonstrations of the achievement of outcomes.

The advice provided by the VCAA gives teachers clear guidance on how flexibility of coursework assessment can be used to develop suitable tasks in accordance with VCAA requirements. Integrated coursework should be used efficiently as an element of the teaching and learning program.

In some cases there was little evidence of subsequent feedback to students. Unlike previous CAT work, coursework provides teachers with the opportunity to give detailed comments on the material assessed. This feedback assists students to gain greater understanding and increase learning, and undertake appropriate review and consolidation of course content.

The use of the logbook varied with a range of schools preparing student booklets that contained both the questions and spaces for the answers. As this practice meets the need for the teacher to be able to authenticate the student work it was acceptable, however care needs to be taken to ensure that while such a structure provides a framework for student response, that it does not direct the form or nature of the response.

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Unit 4 Coursework

GENERAL COMMENTS

The second year of implementation for the Mathematics Revised VCE study, Specialist Mathematics, has confirmed the professional manner in which teachers across Victoria implement the study design. There was a very high degree of compliance with the requirements and intentions as described in the key documents from the VCAA.

Unit 4 requires students to complete three tasks: a problem-solving or modelling application task and two tests. All outcomes are covered by components of the application task, with an emphasis on Outcomes 2 and 3. The two tests should be designed to cover material from each area of study in relation to Outcome 1 and corresponding aspects of Outcome 3 and may contain questions of the types typical of the November examinations. The assessment should be conducted mainly in class, all the use of logbooks that can be easily monitored by the class teacher making it simpler the authentication of student work.

Most teachers used past CAT 1 topics, sample material provided by the VCAA, advice from the December *VCE Bulletin* and resources from the Mathematical Association of Victoria and other agencies, to assist them in setting the Application Task. The tasks set were most appropriate both in terms of content covered and the depth of analysis required. Jessica's Greenhouse was a popular model chosen by teachers to adapt for their students. There were also some excellent original tasks prepared by individual teachers. There were no excessive student responses and little of the time consuming word processing that has drawn so much adverse comment in the past. Obviously there were not the polished presentations of previous years, but rather ample evidence of excellent student learning, along with outstanding analytical and technological skills. It is worth noting that it is not necessary to include a test with the application task.

The content and quality of tests set by teachers were generally of a high standard covering appropriate material and likely to assist students in their preparation for the November examinations. There was some confusion in the assessment of the tests (note only Outcomes 1 and 3 [not 2] are included according to the Study Design [page 165]).

Teachers need to ensure that they provide complete documentation for students prior to the commencing of each task. This should include a full description of the conditions under which the task is to be done such as the time allowed, whether all work is to be done in class, and indication of the way in which the task will be assessed. This means that students need to be given written information as to how the assessment criteria are to be applied. Evidence of feedback to students varied with some work showing few if any comments to students. Teachers are reminded that under the revised study design detailed feedback should be provided to assist student learning.