

Specialist Mathematics GA 1: Unit 3 and 4 Coursework

GENERAL COMMENTS

The tasks to be undertaken by students in the two units of Specialist Mathematics are specified on pages 164–165 of the *VCE Mathematics Study Design*. These tasks must be a part of the regular teaching and learning program, and be completed mainly in class within a limited timeframe under the supervision of the teacher. Supporting advice to assist teachers in implementation of coursework assessment is provided in the ‘Advice to teachers’ section of the study design, and the *Mathematics Assessment Guide VCE 2002*. Advice on a suggested theme and possible starting points for the Application Task was published in the December 2001 *VCE Bulletin*.

To demonstrate achievement of the three outcomes students should be able to:

- define and explain key terms and concepts, as specified in the content from the required areas of study, and to apply a range of related mathematical routines and procedures (Outcome 1)
- apply mathematical processes in non-routine contexts and to analyse and discuss these applications of mathematics (Outcome 2)
- select and appropriately use technology to develop mathematical ideas, produce results and carry out analysis in situations requiring problem-solving, modelling or investigative techniques and approaches (Outcome 3).

Overall School-assessed Coursework was implemented in accordance with the VCAA’s requirements though in some cases it seemed that insufficient time had been allocated to a particular task. Teachers had either devised their own tasks or used a variety of resources to assist in the development of appropriate tasks. These resources included previous common assessment tasks or work requirement activities, advice provided by VCAA, or commercially published material. It is important to note that ideas and approaches from such sources should not be used without being suitably adapted. The challenge for teachers is to provide a range of tasks which interest and involve students whilst ensuring a balance of topics, techniques and applications to allow opportunities to demonstrate achievement of each outcome.

For each task students should be given documentation that clearly details the nature, duration and timing of the task, the conditions under which it is to be conducted and the manner in which the assessment criteria are to be applied. Students should have this prior to the commencement of the task so that they understand what is required and where the emphasis of assessment lies so that they may use the available time most effectively. Students then have an opportunity to ask questions and prepare appropriately. Many teachers used an A4 cover page to do this without jeopardising the integrity of the assessment task.

Tasks

In Unit 3, teachers were required to select two of the following four types of analysis tasks with the second being a different type to the first task:

- **an assignment where students have the opportunity to work on a broader range of problems:**
Teachers and students were able to use this task as an opportunity to review and revise a number of topics in the one piece of work. It was important to ensure that answers to problems required analysis and discussion, not just calculation or the production of other results such as tables and graphs.
- **a short focused investigation, challenging problem or modelling task:**
Many teachers successfully adapted extended tasks set by the former Board of Studies in previous years. Students should not be required 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 used questions similar to those from previous Analysis examination papers. As the course has undergone several modifications in the last decade it is important to ensure that past questions are still relevant to the current course, and that new content is also addressed.
- **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 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 previous years, some teachers still misinterpreted this task and set multiple-choice tests rather than analysis tasks. Such tests do not meet the requirements, neither as analysis nor in length of task.

In each of these analysis tasks it is important to include opportunity and scope for both production of mathematical results and the **analysis and interpretation** of these results as well as the appropriate use of technology.

In Unit 4, students were required to complete two tasks:

- **a problem-solving or modelling application task based on content from the areas of study with several components of increasing complexity, starting with specific case/s through consideration of general**

features of the context to an extension possibly an open-ended investigation of variations of the assumptions or situation

Teachers frequently drew on a starting point from a previous CAT Problem-solving task modifying it to fit time constraints. This task should not be too structured so that students have the freedom to investigate and consider variation of assumptions, domain and range constraints, special cases and limitations of models as appropriate. It is recommended that the task be devised so that technology is explicitly required to be used, for example, in solving more complex equations or in producing tables of values and families of graphs.

- **two equally weighted tests that combine multiple-choice, short-answer and extended response items**

This traditional type of assessment was applied well with teachers basing questions on past examination questions, combined with original questions of their own and questions from commercial sources.

Student responses

Student responses varied in the depth of understanding displayed though nearly all were competent when applying their knowledge and skills in routine situations. They generally demonstrated facility with the technology of the graphics calculator and the computer but should be encouraged to reflect more on the results obtained and to comment on these in greater detail.

Students responded well to tasks that moved from a simple case to more complex generalisations. These provided good opportunities for students to demonstrate understandings and skills and allowed time to examine particular problems in greater depth. This resulted in them receiving valuable feedback on strengths and limitations of their application of the mathematical techniques covered in this study.

Assessment

The outcomes and the assessment criteria as detailed in the *Mathematics Assessment Guide VCE 2002* provided a basis for devising a task and the weighting of a related marking scheme. Some teachers developed a detailed schema that cross-referenced the assessment criteria with expected responses and allocated marks accordingly. Some used the criteria to assess student work more globally while others used more traditional marking schemes. Where teachers use criteria other than those provided by the VCAA, information should be included about how they have been used, and how they relate to the outcomes. In a few cases there was no indication of any criteria having been applied and nor any final score (numerical or alphabetical).

There was variation in both the quality and quantity of student work in response to set tasks. Coursework should be used efficiently as a key element of the teaching and learning program in accordance with the nature, purpose and scope of tasks as described in the study design and the assessment guide.

Some work showed little evidence of subsequent feedback to students. Coursework assessment provides a teacher with the opportunity to give students substantial feedback on their progress and thus assist students to gain greater understanding of key concepts, skills and processes.

Coursework task tallies

GA_type	Component	Task ID	Count	%	Description
Coursework Unit 3/4	1	1	1686	13.6	Assignment
Coursework Unit 3/4	1	2	2852	23.1	Investigation/problem/task
Coursework Unit 3/4	1	3	4747	38.4	Application questions
Coursework Unit 3/4	1	4	3079	24.9	Item response analysis
Coursework Unit 3/4	2	1	6120	ALL	Application task
Coursework Unit 3/4	3	1	6114	ALL	Two tests (mixed question types)