VCE Exam Advice – Units 3 & 4 Specialist Mathematics

A Specialist Mathematics revision program should commence by ensuring that you know all the mathematics which is assumed knowledge, as outlined on pages 208 and 209 of the VCE Mathematics Study Design. If you have not already seen it, the Study Design is a very helpful document and can be found on the internet by entering the VCAA website on www.vcaa.vic.edu.au/ . On the home page, find VCE Study Design Index under Quicklinks, click M under Index of Studies, Specialist Mathematics under Mathematics and Study Design under Curriculum.

As well as providing assumed knowledge, the Study Design contains a comprehensive list of dot points explaining to teachers all of the mathematical content of the course. Make sure that you have covered every dot point during your classes at school, and talk to your teacher if there is something that you think may have been overlooked, (using as much tact as possible; the work may have been covered, and you may not remember, so tread carefully).

- Thoroughly revise all the basic graphs such as $f(x) = ax^m + bx^{-n}$, $f(x) = \dfrac{1}{ax^2 + bx + c}$, circles, ellipses, hyperbolas, reciprocal circular functions, inverse circular functions, lines and curves as well as relations and regions in the complex plane. Recognise the shape of a region in the Argand plane by the description given, especially know the algebraic equations that result in circles (there are 3 of them) and ellipses. Ensure that you are able to sketch neat graphs clearly showing all key features, such as intercepts, stationary points, and asymptotes with their equations. When sketching curves asymptotic behaviour must look asymptotic, so practice actually drawing some of the curves mentioned above so that all the features actually look accurate and the curve is smooth (and symmetrical where it needs to be). Be able to deduce the equation of a reciprocal or inverse circular function curve once you have been given the graph. It is essential that you enter information into your calculator correctly to obtain the desired graph. For example, you must remember to place brackets around all denominators, and your window must be appropriate for the section of the curve you wish to view.

- Ensure that you can do the 'arithmetic' involving complex numbers and vectors correctly. Practice converting complex numbers into Polar form, especially where the angles are multiples of 30° or 45° as these are the ones that will appear in Exam 1. Know and understand what linear independence means in 2 dimensions and in 3 dimensions.

- Practise recognising the method needed to complete an integration, and then practice completing such integrations getting the calculus correct and the numeric processes correct.

- Know the different types of differential equations that you are required to be able to solve, especially if they are described rather than given as an equation (e.g. the rate at which the temperature changes with respect to the pressure is inversely proportional to the square of the pressure. Be able to use implicit differentiation and draw up and use a slope field.

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- Ensure you understand what forces will be needed to be included in a described problem or one where the diagram is provided. Is friction to be included, if so, is it the maximum (μN) or is it less than this. Does the sum of the forces vectorially add to give zero or do they equal ma. Is the acceleration constant (and so you can use the 'Physics' formulas) or is it a variable of x, v or t? Know how to deal with 'lift' problems.

- The next step is to work through Examination revision texts such as Specialist Notes (A+), or Exambusters (Cambridge), which provide valuable advice regarding exam techniques and examiner expectations. Make sure that you have the VCAA formula sheet with you whilst working through these questions. There are a variety of other resources, which you and some of your friends who also study Specialist Mathematics may like to share, so that the individual purchase expense is reduced. It can also be helpful to study with a friend, although you must make sure that you stay on task.

- Attempt the short-answer questions first. If you have to refer to your text book or note book to find the appropriate rules to solve a particular question then you need to make notes of these rules, learn and memorise them. Hopefully, you will have built up all the essential skills after you have completed the majority of these short-answer questions.

- It is now assumed that all students have access to a CAS in the exam.

- Work through the multiple-choice questions next and make use of your calculator. However, be aware that not all multiple-choice questions require the use of a calculator, so it is important to learn to recognise the types of questions that cannot be solved using technology.

- If you run out of time during your second examination, make sure that you record an answer for each multiple question, even if your answer is a guess.

- As soon as you are able, commence working on extended-answer questions. When working through these questions, resist the temptation to consult solutions too quickly. It is best to complete a whole question or a complete topic area before checking answers. Some students refer to solutions too quickly and don't spend enough time pondering possibilities – which impedes on how much they learn. Make use of your calculator and reference materials for these types of questions. Hopefully the more questions you work through, the less time you will need to spend consulting your reference materials! The extended answer questions are worth nearly half of your total marks for both examinations combined, and as they tend to require more effort, can be neglected during times of revision and preparation.

- Previous reports by the chief assessor are invaluable information on how to avoid unnecessary errors, and achieve the best score possible.

- Complete as many other practice examinations as possible under examination conditions in order to establish an appropriate pace. Use your calculator and Reference Materials for Exam 2.

- During your practice examinations, read each question carefully, paying attention to the requirement of the final answers such as exact value, the number of decimal places, number of significant figures, etc. and check to see whether you have answered all parts of the question. Have you given the correct units in your final answers? Have you fully answered the question that was asked? Have you shown all working out for questions worth more than 1 mark?

- On the day of the examination, make sure that you have all required materials, a spare set of fresh batteries for your calculator for your second examination and that you are well rested. Do not try to complete last minute revision.

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- **Suggested Practice Examination Papers:**

  VCAA exams
  MAV Exams
  NEAP Exams
  Heffernan Exams
  Kilbaha Exams
  Insight Exams
  And of course – the FREE TSFX examination papers that are available at www.tsfx.com.au   (see VCEedge online).

  **More subject specific advice will be issued to
  students at our "Essentials – Final Exam Revision Lectures".**

Good luck with your exam preparations!
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