# Pre-approved Learning and Assessment Plan

Stage 2 Mathematical Methods (aligns with Program 1)

Pre-approved learning and assessment plans are for *school use only*.

* Teachers may make changes to the plan, retaining alignment with the subject outline.
* The principal or delegate endorses the use of the plan, and any changes made to it, including use of an addendum.
* The plan does not need to be submitted to the SACE Board for approval.

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| School |  | Teacher(s) |  |

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| SACE school code | | |  | Year |  | Enrolment code | | | | |  | Program variant code (A–W) |
| Stage | Subject code | | | No. of credits (10 or 20) |
|  |  |  |  | **2** | **M** | **H** | **S** | **20** |  |

Addendum – changes made to the pre-approved learning and assessment plan

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| Describe any changes made to the pre-approved learning and assessment plan to support students to be successful in meeting the requirements of the subject. In your description, please explain:  what changes have been made to the plan   * the rationale for making the changes * whether these changes have been made for all students, or for individuals within the student group. |

Endorsement

The use of the learning and assessment plan is approved for use in the school. Any changes made to the plan support student achievement of the performance standards and retain alignment with the subject outline.

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| Signature of principal or delegate |  | Date |  |

# Assessment overview

Stage 2 Mathematical Methods – 20 credits

The table below provides details of the planned tasks and shows where students have the opportunity to provide evidence for each of the specific features of all of the assessment design criteria.

Assessment Type 1: Skills and Applications Tasks – weighting 50%

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| Assessment details | Assessment design criteria | | Assessment conditions  (e.g. task type, word length, time allocated, supervision) |
| CT | RC |
| SAT 1: Further Differentiation and Applications  Students demonstrate mathematical knowledge and skills from Topic 1. The content covers key questions and key concepts within subtopics 1.1 to 1.3.  SAT 1 is divided into two parts. Part 1 will be completed without a calculator or notes and for Part 2 students have access to appropriate technology and notes. Students commence the SAT with both parts of the task (non-calculator and calculator) but will not have access to a calculator or notes until Part 1 is collected.  The SAT will have questions that are routine and complex in nature, including some contextual problems requiring interpretation of the results. | 1,2,3,4 | 1,3,4 | Supervised written assessment  Total Time: 45 minutes  Part 1 : 30 minutes  No calculator or notes permitted  Part 2 : 15 minutes  Access to graphics calculator and 1 A4 page of handwritten notes permitted. |
| SAT 2: Differential Calculus  Students demonstrate mathematical knowledge and skills from subtopics 1.4 and 1.5.  The complex questions require students to apply the key concepts to solve problems in a variety of contexts and some require interpretation of the results. Construction of graphical representations may be required to support their problem-solving strategies. Appropriate and effective use of electronic technology is expected. Clear and logical communication of solutions and correct use of notation and terminology are required. | 1,2,3 | 1,2,3,4 | Supervised written assessment  Total Time: 45 minutes  Access to graphics calculator and 1 A4 page of handwritten notes permitted. |
| SAT 3: Discrete Random Variables  Students apply their knowledge and skills to a range of routine and complex questions on content from Topic 2.  Students demonstrate estimating probabilities of discrete random variables using technology. Construction of representations may be required to support their problem-solving strategies.  Appropriate and effective use of electronic technology is expected. Clear and logical communication of solutions and correct use of notation and terminology are required. | 1,2,3 | 1,2,3,4 | Supervised written assessment  Total Time: 60 minutes  Access to graphics calculator and 1 A4 page of handwritten notes permitted. |
| SAT 4: Integral Calculus Test  Provides the opportunity for students to demonstrate their skills in understanding and using integration to solve a range of problems, including concepts from subtopics 3.1 to 3.4.  SAT 4 is divided into two parts. Part 1 will be completed without a calculator or notes and for Part 2 students have access to appropriate technology and notes. Students commence the SAT with both parts of the task (non-calculator and calculator) but will not have access to a calculator or notes until Part 1 is collected.  Students communicate mathematical ideas and reasoning using appropriate notation, representations, and terminology. | 1,2,3 | 3,4 | Supervised written assessment  Total Time: 70 minutes  Part 1 : 30 minutes  No calculator or notes permitted  Part 2 : 40 minutes  Access to graphics calculator and 1 A4 page of handwritten notes permitted. |
| SAT 5: Logarithmic Functions  Students answer questions requiring a clear understand of the relationship between exponential and logarithmic functions and their graphs. The content covered includes concepts from subtopics 4.1 through to 4.3.  Problem solving of natural logarithmic functions and their derivatives using clear, concise and appropriate mathematical terminology is required. Conjecture development and testing will be addressed. Students to be able to understand and interpret solutions accurately with application to the situation. | 1,2,3,4 | 3,4,5 | Supervised written assessment  Total Time: 60 minutes  Access to graphics calculator and 1 A4 page of handwritten notes permitted. |
| SAT 6: Continuous Random Variables and the Normal Distribution and Sampling and Confidence Intervals  Provides the opportunity for students to demonstrate their skills in understanding and appropriate use of the mathematical concepts, processes, and strategies in finding the mean and standard deviation for continuous variables. They are required to create a confidence interval around a sample proportion that may contain the population proportion, and use of the formula around the confidence interval for the mean within questions.  Understanding the Standard Normal distribution with mean of 0 and standard deviation of 1. Application of the formulae to find the connection of the mean and standard deviation of a problem. Students to understand Central Limit Theorem, and its application to a sample distribution, Use of electronic technology is required. | 1,2,4 | 1,2,3,4 | Supervised written assessment  Total Time: 70 minutes  Access to graphics calculator and 1 A4 page of handwritten notes permitted. |

Assessment Type 2: Mathematical Investigation – weighting 20%

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| Assessment details | Assessment design criteria | | Assessment conditions  (e.g. task type, word length, time allocated, supervision) |
| CT | RC |
| Designing a rollercoaster  This task focuses on the key concepts from Topic 1 – Further Differentiation and Applications. Students use their knowledge and understanding of calculus concepts in this topic and make appropriate mathematical connections between functions to design a rollercoaster track, made of segments of different sections. They produce a mathematical report on their investigation. | 1,2,3,4 | 1,2,3,4 | Appropriate investigation report format as described in the Mathematical Methods subject outline.  Maximum of 15 single-sided A4 pages.  4 weeks to complete. Some class time is allowed to support verification. |

External Assessment: Examination – weighting 30%

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| Assessment details | Assessment conditions  (e.g. task type, word length, time allocated, supervision) |
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| External Assessment | 2 hour external examination (from November 2020)  Access to electronic technology required.  Students may refer to two unfolded A4 sheet (four sides) of hand-written notes.  A formula sheet is included in the examination booklet.  The examination is based on the key questions and key concepts in the six topics.  The examination consists of a range of problems, some focusing on knowledge, and routine skills, and applications, and others focusing on analysis and interpretation. Some problems may require students to interrelate their knowledge, skills, and understanding from more than one topic. Students provide explanations and arguments, and use correct mathematical notation, terminology, and representations throughout the examination. |

Eight assessments.Please refer to the Stage 2 Mathematical Methods subject outline.