

# Year 13 Calculus



St Andrew's College

Student Handout 2017:

**Introduction**

**Programme of Learning**

**Assessment**

## Whāia te mātauranga hei orange mō koutou

Seek after learning for the sake of your wellbeing

### ***Kia ora and welcome to Year 13 Calculus for 2017***

Mathematics is the exploration and use of patterns and relationships in quantities, space, and time. Statistics is the exploration and use of patterns and relationships in data. These two disciplines are related but different ways of thinking and of solving problems. Both equip students with effective means for investigating, interpreting, explaining, and making sense of the world in which they live.

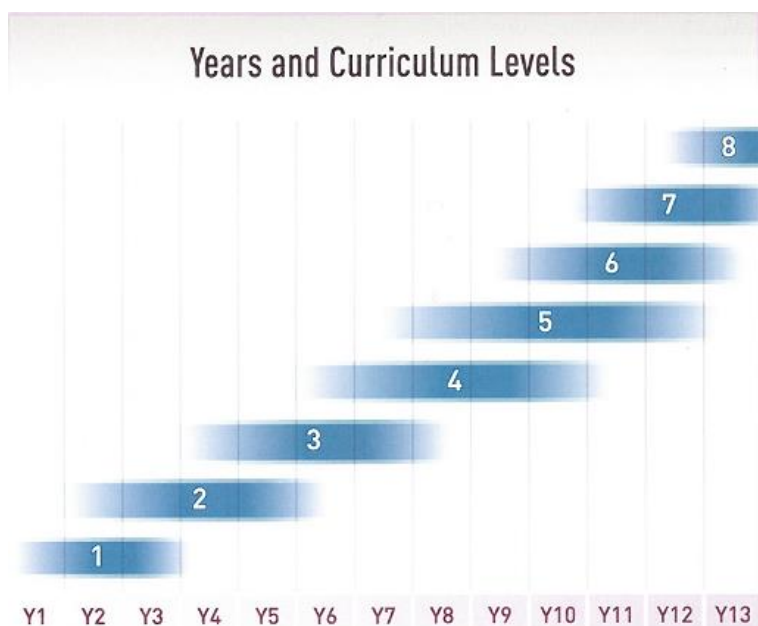
Mathematicians and statisticians use symbols, graphs, and diagrams to help them find and communicate patterns and relationships, and they create models to represent both real-life and hypothetical situations. These situations are drawn from a wide range of social, cultural, scientific, technological, health, environmental, and economic contexts.

#### **Learning area structure**

The achievement objectives are presented in three strands. It is important that students can see and make sense of the many connections within and across these strands.

**Number and algebra** – Number involves calculating and estimating, using appropriate mental, written, or machine calculation methods in flexible ways. It also involves knowing when it is appropriate to use estimation and being able to discern whether results are reasonable. Algebra involves generalising and representing the patterns and relationships found in numbers, shapes, and measures.

**Geometry and measurement** – Geometry involves recognising and using the properties and symmetries of shapes and describing position and movement. Measurement involves quantifying the attributes of objects, using appropriate units and instruments. It also involves predicting and calculating rates of change.



## Key Learning Outcomes

*In a range of meaningful contexts, students will be engaged in thinking mathematically and statistically. They will solve problems and model situations that require them to:*

*For Mathematics:*

Patterns and relationships:

- manipulate trigonometric expressions.
- form and use trigonometric, polynomial, and other non-linear equations.
- form and use systems of simultaneous equations, including three linear equations and three variables, and interpret the solutions in context.
- form and use systems of simultaneous equations, including three linear equations and three variables, and interpret the solutions in context.
- identify discontinuities and limits of functions.
- identify discontinuities and limits of functions.
- form differential equations and interpret the solutions.

## Learning Values at St Andrew's College

The New Zealand Curriculum identifies five key competencies that people use to live, learn, work, and contribute as an active member of their communities. St Andrew's College has developed these as four *Learning Values*. Successful learners make use of and develop these. Each report will be an opportunity to give you feedback on how well you are doing with them. You will also have opportunities to reflect on your own progress with these values.

**Strive to Achieve:** *How determined are you to learn and achieve results that reflect your best efforts?*

- You focus on learning activities consistently and are rarely distracted.
- You behave consistently and appropriately in class settings, regardless of what is going on around you.
- You work hard to set and achieve results that reflect your best efforts.
- You are not put off by setbacks and failures. You know these are a normal part of the learning process.
- You demonstrate a desire to improve and develop as a learner.
- You create additional learning opportunities for yourself because you know that, to learn and remember things, you need to practise what you have learned in the classroom.

**Think:** *How much do you think about what you learn and how you learn it?*

- You have a natural curiosity in the subject and are interested in your learning.
- You can make new information by linking ideas.
- You ask questions to gain more knowledge and help create new information.
- You demonstrate effective critical thinking, questioning the reliability of all information.
- You use a range of thinking strategies without teacher direction and can work out which works best for you as a learner.
- You reflect on how well you have learned, use your reflections to do better in future attempts, and act successfully.

## **Collaborate:** *How well do you learn with and from other people?*

- You participate and contribute to all group activities in lessons and are a positive influence in groups and in the classroom.
- You understand and can explain how your actions contribute to a learning outcome.
- You interact positively with a diverse range of people in a variety of contexts and you actively listen, recognise different viewpoints, negotiate and share ideas.
- You are open to new ideas, approaches, and ways of thinking.

## **Organise:** *How organised are you with your own and others' equipment and learning?*

- You manage time and equipment effectively, in and out of class and can cope under the pressure of assessment.
- You meet deadlines and are able to communicate any issues with your teacher.
- You always have the right equipment for lessons.
- You understand and can explain how being organised contributes to your learning outcomes.

## **Course Endorsement:**

It is possible to gain Course Endorsement in Year 13 Calculus. Course endorsement provides recognition for a student who has performed exceptionally well in an individual course.

Students will gain an endorsement for a course if, in a single school year, they achieve:

- 14 or more credits at Merit or Excellence, and
- at least 3 of these credits are from the externally assessed Algebra, Differentiation or Integration standards (up to 17 credits) and 4 credits are available from internally assessed Trigonometry standard.

**Text:** Delta Mathematics is used as the basis for work in this course. The text is issued to you for the year and should be returned in the same condition as issued to ensure no penalty cost is ensued.

**Additional Worksheets:** These are frequently used, particularly where investigations are deemed to be an essential part of the learning process and should be filed neatly in your clearfile.

**Homework:** After every lesson there is the expectation that students will review the concepts covered, this is in addition to any work set by the individual class teachers. Numerous other resources can be located on the stacnet website ([www.intranet.stac.school.nz](http://www.intranet.stac.school.nz)).

**Equipment:** Each period students are expected to have their own working equipment consisting of Ruler, Calculator as well as the usual writing equipment.

**Calculators:** Scientific Calculators are required to complete the work offered in this course. It is important that students have a suitable calculator to use in each period. Graphic Calculators are an advantage but are not essential for success in this course.

You must take responsibility for notifying your teacher of any problems concerning tests. A mark of (Not Achieved) is given for deliberate absence from a test. If your absence is unavoidable you should inform Mr. Hilliam at the earliest opportunity before the test. In the case of illness you can use the school "voice mail" system. If you have not notified Mr. Hilliam prior to missing a test you will be required to present a doctor's certificate. You should fill in a Student Assessment Request Form and an alternative testing time may be arranged.

If you miss a significant part of a topic for any reason, including long term illness and sports trips, you will need to catch up on the missed work in your own time.

**Compassionate Consideration:** We must have evidence of your ability should you require an estimated mark on compassionate grounds for external examinations. The evidence for this will be your results in the term 3 common exam.

You must sit the common exam to be eligible for compassionate consideration.

**Computers:** These are used at various times throughout the year. It is useful if students have access to a computer with excel spreadsheets and internet connection for homework purposes. Most websites used can be accessed through [www.intranet.stac.school.nz](http://www.intranet.stac.school.nz)

**Competitions:** Year 13 students are offered the opportunity to compete in problem solving competitions during the course of the year. The entry fee associated with these is \$3-\$5 and will be charged to accounts when students indicate their interest to their teacher.

- Eton Mathematics Competition
- Australian Mathematics Competition

**Additional Maths Tuition:** A maths teacher is available in the library every lunch hour from 1:00pm. Mr Gallagher is also available at lunch in SB204 and after school in the library.

**Homework Club:** Year 13 students offer assistance to all students from 3.30-4.30pm every Monday, Tuesday and Thursday. This takes place in various ground floor classrooms in the Arts Block.

# Year 13 Calculus 2017:

TERM I			TERM II			TERM III			TERM IV		
1	30-Jan	Teacher Only Teacher Only	1	1-May	Teacher Only	1	24-Jul	Teacher Only	1	16-Oct	Revision
	to			to			to	Tutor interviews		to	
2	3-Feb	Tutor interviews	2	5-May		2	28-Jul	3.7 Integration 6 Credits	2	20-Oct	
	6-Feb	Waitangi Day		8-May			31-Jul			23-Oct	Labour day
3	10-Feb	3.5 Algebra External 5 Credits	3	12-May		3	4-Aug		3	27-Oct	
	13-Feb			15-May	3.6 Differentiation External 6 Credits		7-Aug			30-Oct	
4	17-Feb		4	19-May		4	11-Aug		4	3-Nov	Exam Leave begins
	20-Feb			22-May			14-Aug			6-Nov	
5	24-Feb		5	26-May		5	18-Aug		5	10-Nov	
	27-Feb			29-May			21-Aug			13-Nov	Junior Exams
6	3-Mar		6	2-Jun		6	25-Aug		6	17-Nov	Exams Start
	6-Mar			5-Jun	Queens BDay		28-Aug			20-Nov	Show Day
7	10-Mar		7	9-Jun		7	1-Sep		7	24-Nov	
	13-Mar			12-Jun			4-Sep	Tournament week		27-Nov	
8	17-Mar		8	16-Jun		8	8-Sep		8	1-Dec	
	20-Mar			19-Jun			11-Sep			4-Dec	
9	24-Mar		9	23-Jun		9	15-Sep	Prelim Exams	9	8-Dec	Teacher Only Teacher Only
	27-Mar	3.3 Trig Internal 4 Credits		26-Jun			18-Sep				
10	31-Mar		10	30-Jun		10	22-Sep		10		
	3-Apr			3-Jul			3 WEEKS BREAK				
	7-Apr			7-Jul							
3 WEEKS BREAK			2 WEEKS BREAK								

## Summary of Requirements for Level Two Standards

This section contains a summary of the expected outcomes for each of the Calculus Level Three Achievement Standards. The purpose of this summary is to give students a simplified and easily accessed idea of what will be assessed for each standard. These summaries in no way replace the actual Achievement Standards and it is assumed that teachers will both provide access to the standards and will fully explain the standards to the students during the normal teaching and learning process. Students will also have access to exemplars that indicate achievement levels for each assessment.

<i>Internal assessment credits</i>	<i>External assessment credits</i>
<b>4</b>	<b>17</b>

### **External Assessments:**

**Mathematics with Statistics AS91577/2:** A.S 3.5 *Apply the algebra of complex numbers in solving problems* **External: 5 credits**

This achievement standard requires you to apply the algebra of complex numbers in solving problems.

- Manipulate complex numbers and present them graphically
- Form and use polynomial, and other non-linear equations
  - This standard will be study in term one.
  - The school examination will provide evidence for a derived grade for this topic, should the need arise.
  - Students will be summatively assessed in the NZQA external exam at the end of the year.

**Mathematics with Statistics AS91578/2:** A.S 3.6 *Apply differentiation methods in solving problems* **External: 6 credits**

This achievement standard requires you to apply differentiation methods in solving problems.

- Identify discontinuities and limits of functions
- Choose and apply a variety of differentiation techniques to functions and relations using analytical methods
  - This standard will be study in term two.
  - The school examination will provide evidence for a derived grade for this topic, should the need arise.
  - Students will be summatively assessed in the NZQA external exam at the end of the year.

**Mathematics with Statistics AS91579/2:** A.S 3.7 *Apply integration methods in solving problems* **External: 5 credits**

This achievement standard requires you to apply integration methods in solving problems.

- Choose and apply a variety of integration and anti-differentiation techniques to functions and relations using both analytical and numerical methods
- Form differential equations and interpret the solutions
  - This standard will be study in term three.
  - The school examination will provide evidence for a derived grade for this topic, should the need arise.
  - Students will be summatively assessed in the NZQA external exam at the end of the year.

## Internal Assessments

**Mathematics with Statistics 91575/2: A.S 3.3 Apply trigonometric methods in solving problems**  
**Internal: 4 credits**

This achievement standard requires you to use trigonometric methods in solving problems

- Manipulate trigonometric expressions
  - Form and use trigonometric equations
- 
- Students will have the opportunity for formative assessment(s) before the actual NCEA summative task.
  - There will be ONE reassessment opportunity for this standard, should a student not achieve the Standard or would like to improve their grade.

## 12 Mathematics and Statistics: How am I going?

Below is some space for you to track your achievement in this course.

### EXTERNAL ASSESSMENTS

	Practice Test	Topic Test	Mid-Year Exam	End of Year Exam
3.6 Differentiation				
3.7 Integration				
3.5 Algebra				

### INTERNAL ASSESSMENTS

		Test	Retest	Final Grade
3.3 Trigonometry				



## Course Endorsement: *am I on track?*

**What do I need?** 14 or more credits at Merit or Excellence at the lower level supports endorsement

**What have I got?**

At least 3 credits from internally assessed standards	Total of internal <i>Merit</i> credits achieved	Total of internal <i>Excellence</i> credits achieved
At least 3 credits from externally assessed standards	Total of internal <i>Merit</i> credits needed	Total of internal <i>Excellence</i> credits needed

# Assessment Policy A –Z: 2017

The Mathematics Department's Assessment Policy is as follows:

**Assessment tasks:** Where possible, you will be offered a range of activities for internal standards and the teacher will teach generic skills, which you will be able to apply to that context.

**Appeals:** You are welcome to appeal your grade. This appeal needs to have the accompanying paperwork (see your teacher for this) and should be handed into the classroom teacher, who will confer with the moderator of that assessment. If the appeal decision is still not accepted, the decision will lie with the Head of Department.

**Authenticity:** We are required to have procedures in place to ensure that *we know that you have completed your assessed work on your own*. This means that any internal assessment task will be carried out under teacher supervision. The Statistics based standards are assessed through a written report done over a week. There will be checkpoints for the statistics reports to ensure students are on track. If a checkpoint is missed, your classroom teacher will contact your parents / caregivers.

**Due dates:** The due date for the Statistical internal assessment will be published on the school's NCEA calendar and you are expected to adhere to this date. No late submissions will be accepted unless they are accompanied by a medical certificate or an extension has been granted prior. If you are absent the week of the assessment, please contact your Mathematics teacher.

**Extensions:** Extensions will be granted on an individual basis when necessary. Application must be made in writing to the Head of Teaching and Learning (Mr David Bevan) at least two weeks prior to the assessment due date.

**Feedback:** The practice assessments for all standards are your official opportunities to receive feedback. It is important you make the most of these formative assessment tasks.

**Moderation:** As a department, we need to ensure that all work is marked to the same standard. Because of this, samples of your work will be given to a senior member of the department to check for consistent marking.

**'Not Achieved' versus 'void':** Because all internal Statistics assessments use class time, any student who does not hand in / perform a completed internal assessment by the due date will receive a *Not Achieved* grade. Unless notification as to why the assessment will not be completed is given prior to the due date and given approval by the Head of Department, you will receive a *Not Achieved* grade.

**Plagiarism:** Using or copying other people's work is plagiarism. This can be from another student or text, including a website or secondary text. It is treated very seriously and any suspected plagiarism will be referred to the Head of Department or to the Head of Teaching and Learning. If you are found to have plagiarized or copied other people's work or sections of other people's work and handed it in as your own, the outcome will be a *Not Achieved* for that assessment, along with other disciplinary action.

**Pre-entry into 2018 courses:** Pre-entry into 2018 courses will be granted on the basis of Common Test results and preliminary examinations. If you do not gain pre-entry, you will need to use your NZQA examination results and risk missing out on a place in a course if the classes are full.

**Resubmission:** Resubmission are only available for Report based (Statistics) internals but not test based Mathematics internals. Resubmissions will happen by invitation-only and be based on the need for you to demonstrate a specific aspect of the criteria. As per NZQA guidelines, you will receive very limited feedback prior to this resubmission. Resubmissions will not be granted if you have a lot of work to do to achieve the standard.

**Reassessment:** Reassessments are only available for test based mathematics internals but not Report based (Statistics) internals. You may have one reassessment opportunity only.

**School Examination:** School Examination results will be used for NCEA derived grades.

**Subject Prizes:** The following grades will be used to calculate the end of year Prize Winner in each subject: *School Examination results, internal assessment results, Common text results completed in exam conditions.*

**Signatures:** You will be required to sign that the work completed is your own when you submit your work. Your signature is also required to confirm the grade received is correct. Signing something means you have read and accept responsibility for your work and grade.

**Storage of work:** All work that is handed in for internal assessment will be kept by your class teacher and stored by the Mathematics Department for the following year.

**Please sign:** *I have read and understand the Mathematics Department's NCEA policy guidelines above:*

Student name : \_\_\_\_\_ signature: \_\_\_\_\_

Parent / caregiver: \_\_\_\_\_

Date: \_\_\_\_\_ 2017

Your Mathematics teacher will give you another copy of this handout and keep it with your assessment material once you have signed it.