

Student  
name:



St Andrew's College

# Year 10 Mathematics 2016

## Course Handbook and Record of Learning

Welcome to the Year 10 Mathematics course at St. Andrew's College.

In this booklet we will explain:

- the content of the course,
- what you need in terms of books and equipment,
- what opportunities are provided to help your learning, and
- how you will be assessed.

**COURSE CONTENT:** Mathematics in New Zealand is broken down into three strands, and these are Number and Algebra, Geometry and Measurement, and Statistics. In a range of meaningful contexts, students will be engaged in thinking mathematically and statistically. They will solve problems and model situations in every topic studied. The Year 10 course is designed to be interesting, challenging, and to form a solid foundation for NCEA. Movement into NCEA requires a more independent approach to thinking and studying and, this year, you will start to make the shift. We hope you enjoy Mathematics this year, that you ask questions whenever you don't understand, and that you take advantage of the opportunities that are here for you at St Andrew's.

**ASSESSMENT:** You will have lots of different types of assessment. Some of the assessments will be used to see how you are going so that you and the teacher can plan what is needed for you to keep doing better. Other assessments will occur at the end of a topic to get a picture of what skills and knowledge you have gained in that topic.

Many of the results will be grades reflecting:

- your level of achievement against the National Curriculum levels, and
- your level of thinking using the SOLO taxonomy.

Assessments may be in the form of a project; an assignment; a skills test; or a group investigation. It is important that you do your best in your assessments so that you can use them to measure your own progress and focus on what you can do to continue learning. You can record the results of assessments in this booklet.

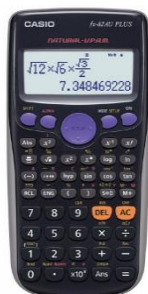
**TRACKING:** This is to identify skill strengths and weaknesses in Number and Algebra. A summary sheet, with examples, indicates the skills assessed. Your teacher will provide you with references for assistance in reinforcing skills. Summary sheets will be given to you and should be used to record your progress on completion of each classroom assessment (once every term). Please keep them in your clear file or your OneNote notebook.

**EXAMINATION:** At the end of this year students will be required to sit a 2 hour examination which will cover many aspects of the course studied throughout the year. It may also call on skills developed in previous years' work.

**COMPETITIONS:** Year 10 students are offered the opportunity to compete in problem solving competitions during the course of the year. The entry fee associated with these is approximately \$6 each and will be charged to accounts when students indicate their interest to their teacher.

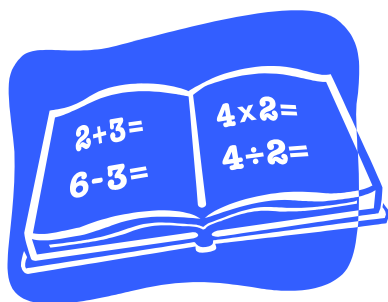
- Otago Junior Mathematics Competition (5<sup>th</sup> April 2017)
- Australian Mathematics Competition (27<sup>th</sup> July 2017)
- Cantamath Team Competition (Two teams selected to represent StAC in CBS arena, 23<sup>rd</sup> August 2016)

**EQUIPMENT:** Each period students are expected to have their own working equipment consisting of a ruler, compasses, a protractor and a calculator as well as the usual writing equipment (pens, pencil, eraser). A calculator may be needed after the first topic of the year and students are expected to bring one to each Maths period.



**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. The preferred model is the CASIO fx82-AU and is part of the stationery list for middle school students. If you do not have a calculator then please purchase one of these models.

**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 relevant websites used can be accessed through the class or subject Moodle site.



**BOOKWORK:** We would like you to take pride in your work, so we do expect that your books will be neatly presented and have no scribbles or graffiti.

It is **very** important that you show your working (thinking) at **all** times – mathematical communication is assessed at all levels.

You should also ensure work is marked and mistakes corrected.

Making mistakes is part of learning, but unless we reflect on what we did wrong and what we could do to get it right, then that learning won't occur.



**HOMEWORK:** One purpose of homework is for you to check that you can remember and use knowledge and skills learned in class, and to ensure that you have covered and practised all work in the syllabus. Homework will be set regularly at the discretion of your mathematics teacher.

Tasks may include: completing work started in class; completing work set from the Education Perfect web site; completing worksheets provided by your teacher; planning, researching and carrying out an assignment; preparing for an assessment. Just as with bookwork, you need to know if your homework is correct so please ensure work is marked and mistakes corrected. **ASK** if you cannot correct a mistake or do not understand where you have gone wrong.



**TEXT:** Beta Mathematics, an electronic textbook is used as the basis for work in this course. It can be downloaded from the year 10 Moodle site.

**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 clear-file.

Numerous other resources can be located on the college mathematics page or your own class Moodle site.

**Education Perfect:** This year St Andrew's College has opted to use Education Perfect and not write-on homework books. Students will be issued with a username and password that will allow them to access the Education Perfect website 24 hours a day for the whole year. For students who do not have appropriate internet access at home, they can use the school computers in the library during any lunchtime or after school.



**ABSENCES:** Occasionally you may miss class because you have been sick or some other event has occurred.

If you are absent, YOU are responsible for catching up on the work missed. This is important because the skills you learn this year are needed for the work you will do next year in NCEA.

To catch up on work you could:

- borrow a friend's book to see what was done on that day (copying out or photocopying any notes or exercises), OR
- arrange a time with your teacher to catch up the missed work.

### **EXPECTATION OF BEHAVIOUR IN THE MATHS CLASSROOM:**

Failure to observe any of these may result in a fatigue/detention.

- Arrive on time with the appropriate equipment ready to learn.
- If you are late, ensure you have a note from Middle School Office.
- Stand in silence at the start of the lesson when your teacher directs you to do so.
- Sit down when your teacher tells you to do so – this indicates that the lesson is about to start and your full attention is required.
- Food and drink (other than water) are not to be brought to the Maths classroom.
- Rooms should always be left as they are found.
- Treat other people and their property with respect.
- Chewing gum is not permitted in school and a detention will be issued immediately.
- No ipods, music players or phones are to be used in the Maths classroom.

**ADDITIONAL MATHS TUTORING:** Sometimes you miss things in class or find a topic hard to understand. Often this can be quickly fixed by spending some time individually with a teacher outside class. A maths teacher is available in the library every lunch hour from 1:00pm. Alternatively speak to your class teacher to arrange a time for additional help.



**MATHS 4 FREE:** This maths workshop operates every Monday and Tuesday in the library after school for additional help with mathematics.

**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.

All the best for a successful year! If you have any questions or queries, in the first instance please contact your Maths teacher. You may wish to contact Mr Ben Hilliam (Assistant Head of Mathematics) whose email address is [bhi@stac.school.nz](mailto:bhi@stac.school.nz)

My maths teacher for 2017 is ..... (.....)

Student Signature
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Parent Signature
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# Year 10 Topic Summary

<b>PRE-ALGEBRA</b>  <i>Beta chapters 1, 2, 3, 4, 5, 6</i> Basic Number understanding and use Powers and roots Significant figures & Standard Form Rates & Ratio	<b>GEOMETRY &amp; MEASUREMENT 1</b>  <i>Beta chapters 18- 20, 22 - 25</i> Angle rules & Parallel lines Polygons & Similar Shapes Bearings Pythagoras Trigonometry
<b>LINEAR ALGEBRA</b>  <i>Beta chapters 7, 8, 9, 10, 12</i>  Substitution into formulae Expressions Solving linear equations Solving quadratic equations Relations	<b>STATISTICS 1</b>  <i>Beta chapters 29, 30, 31, 32</i>  Interpreting data Reports Statistical enquiry cycle
<b>NON-LINEAR ALGEBRA</b>  <i>Beta chapters 11,12,13</i>  Expanding Factorising Quadratics Lines and Parabolas	<b>PROBABILITY</b>  <i>Beta chapter 33</i>  Experimental probability Theoretical probability Tree diagrams Simulation
	<b>NUMBER 2</b>  NCEA AS 91026 (Math 1.1) Solving Problems using Numeric Reasoning

# Year 10 Results

Topic	How did I feel at the start of the topic?	How did I feel at the end of the topic?	Assessment result
Pre-Algebra			
Geom/Meas			
Linear Algebra			
Statistics			
Non-linear Algebra			
Probability			
Number NCEA			

## Learning Values

	Thinking and Creating	Collaboration	Striving to Achieve	Organisation
Interim				
Mid – goal				
Mid - teacher				
End– goal				
End - teacher				

## Fluency

Start of Year		End of Year	

## Mastery

	Initial Level of Mastery	Final Level of Mastery
Addition		
Subtraction		
Multiplication		
Division		

# MASTERY LEVELS

We feel it is important that every student gains mastery in some elementary areas of mathematics. In order to promote this, a series of basic mathematical skills are tested against the clock resulting in students attaining various levels of Mastery.

- |                         |                           |
|-------------------------|---------------------------|
| 50 or more correct..... | I am a MASTER             |
| 65 to 79 correct.....   | I am a GRAND MASTER       |
| 80 or more correct..... | I am a SUPER GRAND MASTER |

*Practice sheets are available on the intranet, these can be randomly generated using the F9 key.*

The challenge has been set: **How many can you do in 60 seconds?**

		Scores	Teacher Signature	Date Achieved
ADD	MASTER			
	GRAND MASTER			
	SUPER GRAND MASTER			
SUBTRACT	MASTER			
	GRAND MASTER			
	SUPER GRAND MASTER			
MULTIPLY	MASTER			
	GRAND MASTER			
	SUPER GRAND MASTER			
DIVIDE	MASTER			
	GRAND MASTER			
	SUPER GRAND MASTER			

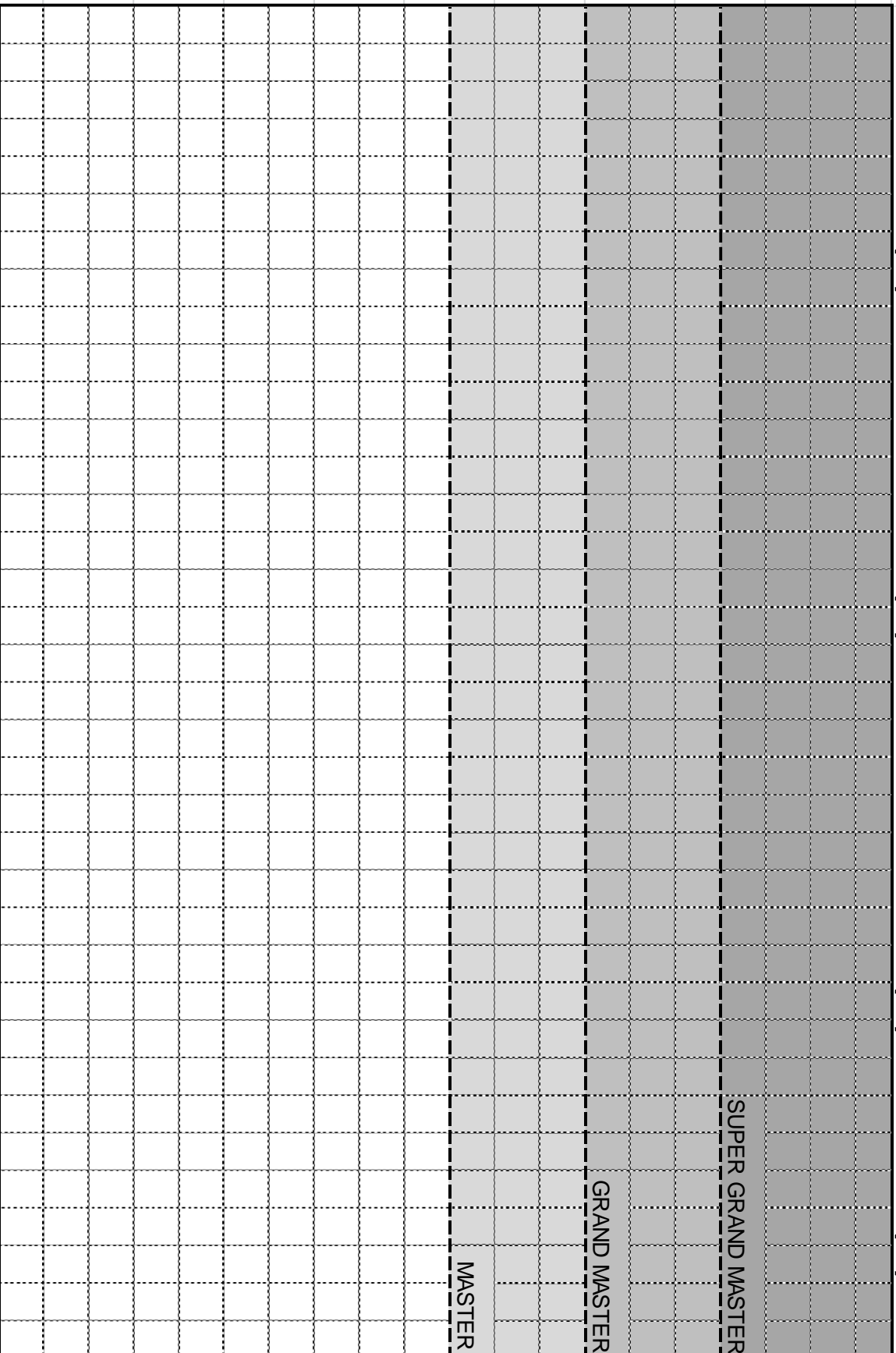


MY MASTERY RESULTS FOR:

**ADDITION ( ), SUBTRACTION ( ), MULTIPLICATION ( ), DIVISION ( ).**

**NUMBER CORRECT**

90  
80  
70  
60  
50  
40  
30  
20  
10  
0



# TRACKING PROGRESS CHARTS

Complete the following sheets by filling in boxes under each problem with

- a tick (✓) – I got it correct
- a cross (×) – I need to work on this

Complete the sheet when your marked tracking sheet is returned to you. This will help you:-

- identify areas of strength
- identify areas of weakness
- record improvement throughout the year

Use the Text references and Mathletics to improve your understanding when unsure and remember the other options for help....

- see your teacher
- see one of the Maths teacher in the library at lunchtime
- Maths 4 Free
- Homework Club

..... as outlined at the start of this booklet.



“Striving for success without hard work is like trying to harvest where you haven’t planted.” David Bly



**YEAR 10 TRACKING SHEET: NO CALC**  
**PROGRESS CHART**

Basic Arithmetic		$115 + 37$	$25 - 17$	$205 \times 32$	$248 \div 4$	$576 \div 12$
Bedmas Ex 1.1, 1.16		$\frac{4+6}{2} - 3$	$3 + (5-1)^2$	$(4+4 \times 4) \div 2^2$	$\frac{20-4^2}{2} \times (7-4)$	$\frac{-7 - \sqrt{7^2 - 4 \times 3 \times 2}}{2 \times 3}$
FRACTIONS	Add/Subtract Ex 2.7-2.10, 2.12	$\frac{1}{2} - \frac{1}{3}$	$4 - 2\frac{1}{3}$	$3\frac{1}{4} + 2\frac{3}{8}$	$5\frac{1}{4} - 2\frac{3}{7}$	$\frac{1}{3} + 2\frac{1}{4} - 1\frac{2}{5}$
	Multiply/Divide Ex 2.3-2.6, 2.12	$3\frac{1}{5} \times 4$	$2\frac{4}{5} \div 3\frac{1}{6}$	$\frac{4}{15} \div \frac{45}{64}$	$\frac{2}{5} \times 1\frac{1}{2} \times \frac{1}{4}$	$3\frac{1}{2} \div \frac{2}{5} \div 2$
DECIMALS	Add/Subtract Ex 1.5-1.6	$3.7 + 4.65$	$19.562 + 7.01$	$4.3 - 0.005$	$8.76 + 4.832$	$11.35 - 3.7 + 1.025$
	Multiply Ex 1.7-1.8	$6.45 \times 0.4$	$3.48 \times 2.6$	$7.52 \times 0.43$	$31.35 \times 2.053$	$6.3 \times 0.45 \times 1.24$
	Divide Ex 1.9	$51.75 \div 3$	$29 \div 0.2$	$3.68 \div 0.2$	$0.584 \div 0.008$	$5.6 \div 2.3$
Percentages Chapter 3		$28/50$ as a percentage	10% of 160	75% of 240	Find GST to add onto \$220	120% of 48
Integers Ex 1.11-1.15		$-6 + -8$	$13 - -7$	$6 \times -5$	$-24 \div -6$	$(-4)^3$

**I need to work on this**

**I can do this**

# YEAR 10 TRACKING SHEET: ALGEBRA

## PROGRESS CHART


Add and subtract like terms Ex 23.2	$3x - 2x + 2y + y$	$2x - 5 - x + 9$	$5xy + 2x - xy - 4x$	$x^2y + 2xy + 3x^2y$	$x^2 + x + 3x^2 - 3x + 4$
Multiply algebraic terms Ex 23.4 – 23.7	$4x^2 \times 2x^3$	$3x^2y \times 2y$	$6x^2y \times 3xy^4$	$(5x^2y^4)^2$	$3(2x^4)^2$ or $\sqrt{25x^8}$
Divide algebraic terms Ex 23.8	$\frac{10x^4}{5x^2}$	$\frac{10x^4}{15x}$	$\frac{-4x}{6x^3}$	$\frac{x^2y}{xy}$	$\frac{4x^2y^3}{8x^4y}$
Substitute into formula Ex 22.3 – 22.4	$x = 2, y = 3$ $4x - y$	$y = 3, z = -2$ $yz$	$y = 3, z = -2$ $y^2 - z$	$y = 3x + 4$ if $x = 0, y = ?$	$y = (x - 1)(x + 2)$ if $x = 3, y = ?$
Expand one bracket Ex 24.1 – 24.3	$3(2x + 1)$	$-2(x - 4)$	$6x(2x - 3)$	$2(x + 3) - 4(x + 2)$	$3(x + 2) - (2x - 3)$
Expand two brackets 26.4 – 26.7	$(x + 2)(x + 3)$	$(x + 4)(3 - x)$	$(2x + 3)(3x - 4)$	$(x + 3)^2$	$(x + 1)(x^2 + 2x - 4)$
Solve equations Ex 25.1 – 25.11	$3x - 4 = 2$	$3(x + 4) = 19$	$\frac{x}{3} - 6 = 7$	$x - 2 = 4x - 6$	$5(x + 3) = 3(x + 8)$
Factorise into one bracket Ex 24.5 – 24.8	$6x + 3$	$-2x - 4$	$12x^2 - 18x$	$x(x + 3) + 2(x + 3)$	$ac + bc + ad + bd$
Factorise into two brackets Ex 26.8 – 26.12	$x^2 + 5x + 6$	$x^2 + x - 12$	$x^2 - 9$	$2x^2 + 8x - 10$	$3x^2 + 5x + 2$
Rearrange formulas Make 'x' the subject	$xy = 5$	$y = x + 3$	$y = \frac{x}{5}$	$y + 3x = 4$	$y = \sqrt{(x + 3)}$

I need to work on this

I can do this

# YEAR 10 TRACKING SHEET: CALCULATOR

## PROGRESS CHART

Order from Smallest to Largest		6, 12, 21, 0, 8	2, -5, -3, -1, 5	0.2, 0.21, 0.02, 2.0, 0.202	$\frac{1}{2}, \frac{2}{3}, \frac{1}{3}, \frac{3}{5}, \frac{1}{6}$	$\frac{1}{3}, 0.25, 40\%, 0.3, \frac{3}{5}$
FRACTIONS	Manipulation Ex 2.2 2.11		$\frac{2}{3} = \frac{?}{18}$	Simplify: $\frac{28}{42}$	Write $\frac{37}{5}$ as a mixed number	Write $4\frac{2}{3}$ as an improper fraction
	Calculations Chapter 2	$\frac{1}{6}$ of 20	$\frac{1}{5} + \frac{2}{3}$	$\frac{2}{3} \div \frac{1}{9}$	$-\frac{3}{4} - \frac{1}{5}$	$2\frac{4}{5} \times 3\frac{1}{6}$
Decimals Ex 1.4-1.10		5.3 + 7.04	$\frac{3}{5} =$	36% =	$(12.43 \times 3.8) + 2.4$	$\frac{2.469 - 0.0043}{3.6}$
Percentages Chapter 3		Find 23% of 64	Find 15 out of 24 as a percent	Increase 650 by 15%	Find percentage change from 36 to 45	40% of x is 14. What is x?
Rounding Ex 4.1-4.3		Round to 2dp 34.5682	Round to 2dp 0.5982	Round to 2sf 5.753	Round to 2sf 26730	Round to 2sf 0.0003545
Powers Ex 1.17		$15^3$	$-6^4$	$25^{1/2}$	$\left(\frac{2}{3}\right)^4$	$8^{-2}$
Roots Ex 1.18		$\sqrt{7056}$	$\sqrt[3]{3375}$	$\sqrt[4]{4096}$	$\sqrt[3]{64^2}$	$\sqrt[5]{1/2}$
Standard Form Ex 4.4-4.12		$281.643 \times 0.01$	$2.4367 \times 10^2$	$3.631 \times 10^{-2}$	Write in Std Form: 3450000	Write in Std Form: 0.000004574

I need to work on this

I can do this