



St Joseph's College Gregory Terrace

Year 9 Mathematics - 2015

Text:	
Student text in PDF:	Students can access the text via Chapter PDF's that can be accessed via the MOODLE.
Scientific calculator: Casio fx82ms	Bring to every lesson - also needed for homework

The four proficiency strands of the AUSTRALIA CURRICULUM MATHEMATICS (ACM) *Understanding, Fluency, Problem Solving and Reasoning* are an integral part of mathematics content across the three content strands: *Number and Algebra (NA), Measurement and Geometry (MG), and Statistics and Probability (SP)*. The proficiencies reinforce the significance of working mathematically within the content and describe how the content is explored or developed. They provide the language to build in the developmental aspects of the learning of mathematics.

At the year 9 level: (ACMNA208-215, 294,296, ACMMG216-224, ACMSP225-228, 282-284)

Understanding includes describing the relationship between graphs and equations, simplifying a range of algebraic expressions, explaining the function of relative frequencies and probabilities, calculating areas of shapes and surface areas of prisms and the constancy of the trigonometric ratios for right-angle triangles. **Fluency** includes applying the index laws to expressions with integer indices, expressing numbers in scientific notation, listing outcomes for experiments and developing familiarity with calculations involving the Cartesian plane. **Problem Solving** includes calculating surface areas and volumes of right prisms, applying ratio and scale factors to similar figures, solving problems involving right-angle trigonometry, and collecting data from secondary sources to investigate an issue. **Reasoning** includes following mathematical arguments, evaluating media reports and using statistical knowledge to draw conclusions, developing strategies in investigating similarity and sketching linear graphs.

By the end of Year 9, students solve problems involving simple interest. They interpret ratio and scale factors in similar figures. Students explain similarity of triangles. They recognise the connections between similarity and the trigonometric ratios. Students compare techniques for collecting data in primary and secondary sources. They make sense of the position of the mean and median in skewed, symmetric and bimodal displays to describe and interpret data. Students apply the index laws to numbers and express numbers in scientific notation. They expand binomial expressions. They find the distance between two points on the Cartesian plane and the gradient and midpoint of a line segment. They sketch linear and nonlinear relations. Students calculate areas of shapes and the volume and surface area of right prisms and cylinders. They use Pythagoras' Theorem and trigonometry to find unknown sides of right-angled triangles. Students calculate relative frequencies to estimate probabilities, list outcomes for two-step experiments and assign probabilities for those outcomes. They construct histograms and back-to-back stem-and-leaf plots.

**Support and Extension:****Guide to the HOTmaths integrated program**

Cambridge HOTmaths teacher and student subscriptions are available to bundle with the *ICE-EM Mathematics* textbook series.

This program integrates the content of the two resources, suggesting which HOTmaths topics, lessons, widgets, walkthroughs and HOTsheets could be used with the textbook chapters. It is provided for the use of teachers, students and parents.

A Cambridge HOTmaths student account allows students to use the full range of HOTmaths content in class or at home, and enables the teacher to use the **Progress Tracker** (a learning management system) to monitor students' work and topic quiz scores. (Parents can also track their own child's work). This makes it an ideal homework and revision resource.

A Cambridge HOTmaths teacher account allows HOTmaths to be run on one computer in a classroom, and is particularly useful when delivered via data projectors and interactive whiteboards.

HOTmaths is constantly adding new content and lessons to its database of material. This document will be updated to reflect changes, and users should regularly check HOTmaths for updates and to explore new material.

Note that the review topics in the textbooks are not aligned with specific lessons. Instead, teachers can access Topic Quizzes or Topic Scorchers for review and revision.

HOTmaths content is available from <http://www.hotmaths.com.au/>; users will need an account and login.

SEMESTER 2 Assessment:

Semester 2	Weighting	Timeline
Mid Term 3 Review	10%	Issued Week 4 of Term 3 - due Week 5 of Term 3
Mid Semester 2 Exam	40%	September - End of Term 3 - 1 ½ hours + 5 mins perusal
Mid Term 4 Review	10%	Issued Week 4 of Term 4 - due Week 5 of Term 4
End Semester 2 Exam	40%	November - End of Term 4 - 1 ½ hours + 5 mins perusal



ACM ↔ Australia Curriculum Mathematics;	NA ↔ Number and Algebra;	MG ↔ Measurement and Geometry	SP ↔ Statistics and Probability
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Note: Students are away on camp throughout term 3 - this schedule is designed to assist students catch up on work that they have missed during their time at Maroon.

Term 3 week	TOPIC and Exercises	ICE-EM MATHEMATICS <small>Australian Curriculum Edition</small>	9	ACM Content Descriptors
1 - 3	11 Coordinate Geometry 11A Distance between two points (Q1-3a,c,d 4, 6, 8) 11B The midpoint of an interval (Q1-3a,c,e 4, 10) 11C The gradient of a line (Q1-3a,c,e 4a, 7, 9) 11D The equation of a straight line (Q1a,c,e 2a, 3a,c 6a,c, 8a,b 10, 12a,b) 11E Graphing straight lines (Q1a,c 2a, 3a,g) 11F The equation of a line using the gradient and a point (Q1a,b,c 2, 4a,c,d) 11G Parallel and perpendicular straight lines (Q1, 2a, 6, 7, 8a)			ACMNA 214 ACMNA 294 ACMNA 215
3 - 4	12 Probability 12A An introduction to probability (Q2, 7, 8, 11) 12B The complement, union and intersection (Q2, 7, 8, 10, 11) 12C Relative frequency (Q7, 10) 12D Multi-stage experiments (Q6, 10, 12, 13, 15) 12E Two-step experiments involving replacement (Q1, 4, 5)			ACMSP225 ACMSP226
4 - 5	Mid Term 3 Review: Issued End of Week 4 → Due Beginning of Week 5			
5 - 6	13 Trigonometry 13A Introduction (Q1, 3, 5a,c 6) 13B The tangent ratio (Q1-4a,b,c) 13C The three basic trigonometric ratios (Q1-7a,b,c 9) 13D Finding angles (Q1-3a,b,c) 13E Miscellaneous exercises (Q1-2b,c,d) 13F Solving problems using trigonometry (Q1, 6, 11, 12, 18, 20) 13G True bearings (Q1, 4, 9)			ACMMG223 ACMMG224
7 - 8	14 Simultaneous Linear Equations 14A Solving simultaneous equations by drawing graphs (Q2, 3a,c) 14B Substitution (Q1a,b,c 2a, 3a) 14C Elimination (Q1a,b,c,d 2a,e,g 5g) 14D Problems involving simultaneous linear equations (Q2, 6, 8, 11) 14E Geometry and simultaneous equations (Q2a, 3a)			ACMNA215
8 - 9	18 Rates and Direct Proportion 18A Rates (Q3a,b, 4a, 5, 7, 9, 10) 18B Direct proportion (Q1a, 4a,b,c 8a,b,c 11)			ACMNA208
9-10	Revision Ch 11, 12, 13, 14 and 18			
10	Examination (1½ hours + 5 minutes perusal)			



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Note: Students are away on camp throughout term 4 - this schedule is designed to assist students catch up on work that they have missed during their time at Maroon.

Term 4 week	TOPIC and Exercises	ICE-EM MATHEMATICS Australian Curriculum Edition	ACM Content Descriptors
1 - 2	15 Further Factorisation 15A Review of factorization (Q1a,b,f,g 2a-d, g,m,q,r 3a,b,d,e 4b,c g,i,l,n,m,p 6a,c,d) 15B Grouping (Q1a,c,d 2d,e,h 3a,c,e,h) 15C Factorising monic quadratics (Q1a-f, 2a,c,e,g,h,i) 15D Factorising the general quadratic $ax^2 + bx + c$ (Q1a-f, 2a-g 3a-f) 15E Simplifying, multiplying and dividing algebraic fractions (Q1a,c,e 2a, 3a, 4b)		ACMNA213
3 - 4	16 Measurement - Areas, Volume and Time 16A Review of area (Q1a,c,e,g,h 2d, 3c, 6bi,ii,v 8, 10a,c,d,f,m 11b,c,e 17) 16B Review of surface area of a prism (Q1a,c 2, 4, 5e, 6) 16C Surface area of a cylinder (Q1a,b,c 2, 4) 16D Volumes (Q1a,c,e, 3a,c,g,i, 5a,c,e, 6a) 16E Conversion of units (Q1-3a, 5, 13a, 14a, 15, 18) 16F Small and large units of measurement (Q1a,b 2a, 3a, 9a)		ACMMG216 ACMMG217 ACMMG218 ACMMG219
4 - 5	Mid Term 4 Review: Issued End of Week 4 → Due Beginning of Week 5		
5 - 6	17 Quadratic Equations 17A Solution of simple quadratic equations (Q1a,b,d,j 2a,c,e,f,l 3a,b,c 4a,b,c 5b,d,h) 17B Solution of quadratic equations when the coefficient of x^2 is not 1 (Q2a,b,c 4a,b) 17C Quadratics in disguise (Q1a,b,c 2a,d, 3a) 17D Applications of quadratic equations (Q1, 6, 9, 11) 17E Graphs of equations (Q1a,b,c 2a, 4, 5)		ACMNA213 ACMNA296
7 - 8	19 Statistics 19A Stem-and-leaf plots and back-to-back stem-and-leaf plots (Q1, 2, 6, 8) 19B Grouped data (Q1, 2, 6) 19C Histograms and summary of representations (Q1, 3, 7, 9) 19D Mean, median, mode and range (Q1a,b 2, 10a,b 12, 13, 19b, 20b,c) 19E The statistical investigation process (Q1a 2c discussions)		ACMSP227 ACMSP228 ACMSP282 ACMSP283 ACMSP284
8	Revision Ch 15, 16, 17 and 19		
8	Examination (1½ hours + 5 minutes perusal)		



Proficiency Strands and Criterion:

CRITERION	ACM PROFICIENCY STRANDS	DESCRIPTORS				
		A	B	C	D	E
		The student work demonstrates evidence of:				
Knowledge and Procedures	Understanding	Comprehensive knowledge and understanding of concepts, facts and procedures	Thorough knowledge and understanding of concepts, facts and procedures	Satisfactory knowledge and understanding of concepts, facts and procedures	Variable knowledge and understanding of concepts, facts and procedures	Rudimentary knowledge and understanding of concepts, facts and procedures
	Fluency					
Modelling and Problem Solving	Problem Solving	Insightful application of mathematical processes to generate solutions and check for reasonableness	Proficient application of mathematical processes to generate solutions and check for reasonableness	Competent application of mathematical processes to generate solutions and check for reasonableness	Variable application of mathematical processes to generate solutions and check for reasonableness	Minimal application of mathematical processes to generate solutions and check for reasonableness
Communication and Justification	Reasoning	Clear and accurate communication of ideas, explanations and findings using mathematical representations, language and technologies	Coherent and accurate communication of ideas, explanations and findings using mathematical representations, language and technologies	Sound communication of ideas, explanations and findings using mathematical representations, language and technologies	Disjointed communication of ideas, explanations and findings using representations, language and technologies	Unclear communication of ideas, explanations and findings using representations, language and technologies
		Perceptive reflection on thinking and reasoning, the contribution of mathematics and learning	Informed reflection on thinking and reasoning, the contribution of mathematics and learning	Relevant reflection on thinking and reasoning, the contribution of mathematics and learning	Superficial reflection on thinking and reasoning, the contribution of mathematics and learning	Cursory reflection on thinking and reasoning, the contribution of mathematics and learning

Criterion 1 - Knowledge and Procedures:

A+ ≥ 98%	A ≥ 88%	A- ≥ 85%
B+ ≥ 83%	B ≥ 73%	B- ≥ 70%
C+ ≥ 68%	C ≥ 53%	C- ≥ 50%
D+ ≥ 48%	D ≥ 28%	D- ≥ 25%
E+ ≥ 23%	E ≥ 10%	E- < 10%

Criterion 2 - Modelling and Problem Solving:

A+ ≥ 95%	A ≥ 73%	A- ≥ 70%
B+ ≥ 68%	B ≥ 53%	B- ≥ 50%
C+ ≥ 48%	C ≥ 23%	C- ≥ 20%
D+ ≥ 18%	D ≥ 8%	D- ≥ 5%
E+ ≥ 3%	E ≥ 2%	E- ≥ 0-1%

Global result - Minimum standards:

A	A in any 2 criteria and a B in the third
B	B in any 2 criteria and a C in the third
C	C in Knowledge and Procedures, 1 other C and a D
D	D in Knowledge and Procedures and 1 other D
E	E in Knowledge and Procedures

The semester results will be refined with '+' and '-' reflecting the combined effect of all 3 criteria

**Year 9 Australia Curriculum Content Descriptors**

Number and Algebra	<p>(ACMNA208) Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems</p> <p>(ACMNA209) Apply index laws to numerical expressions with integer indices</p> <p>(ACMNA210) Express numbers in scientific notation</p> <p>(ACMNA211) Solve problems involving simple interest</p> <p>(ACMNA212) Extend and apply the index laws to variables, using positive integer indices and the zero index</p> <p>(ACMNA213) Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate</p> <p>(ACMNA214) Find the distance between two points located on a Cartesian plane using a range of strategies, including graphing software</p> <p>(ACMNA294) Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software</p> <p>(ACMNA215) Sketch linear graphs using the coordinates of two points and solve linear equations</p> <p>(ACMNA296) Graph simple non-linear relations with and without the use of digital technologies and solve simple related equations</p>
Measurement and Geometry	<p>(ACMMG216) Calculate the areas of composite shapes</p> <p>(ACMMG217) Calculate the surface area and volume of cylinders and solve related problems</p> <p>(ACMMG218) Solve problems involving the surface area and volume of right prisms</p> <p>(ACMMG219) Investigate very small and very large time scales and intervals</p> <p>(ACMMG220) Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar</p> <p>(ACMMG221) Solve problems using ratio and scale factors in similar figures</p> <p>(ACMMG222) Investigate Pythagoras' Theorem and its application to solving simple problems involving right angled triangles</p> <p>(ACMMG223) Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles</p> <p>(ACMMG224) Apply trigonometry to solve right-angled triangle problems</p>
Statistics and Probability	<p>(ACMSP225) List all outcomes for two-step chance experiments, both with and without replacement using tree diagrams or arrays. Assign probabilities to outcomes and determine probabilities for events</p> <p>(ACMSP226) Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or'</p> <p>(ACMSP227) Investigate reports of surveys for information on how data were obtained to estimate population means and medians</p> <p>(ACMSP228) Identify everyday questions and issues involving at least one numerical and categorical variable, and collect data directly from sources</p> <p>(ACMSP282) Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi modal'</p> <p>(ACMSP283) Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread</p> <p>(ACMSP284) Investigate techniques for collecting data, including census and sampling</p>