St Joseph's College Gregory Terrace

Year 10 Mathematics – SEMESTER 2

Text:	ICE-EM MATHEMATICS Australian Curriculum Edition 10
Student text in PDF:	Students can access the text via Chapter PDF's that can be accessed via the MOODLE.
Graphing calculator: Texas Instruments (TI-83+, TI84, TI-84+)	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 10 level: (ACMNA229-241, ACMMG242-245, ACMSP246-253)
and year 10A level: (ACMNA264-269, ACMMG272-276, ACMSP278 - 279);
Understanding includes describing patterns in uses of indices, applying the four operations to algebraic fractions, finding unknowns in formulas after substitution, making the connection between algebraic and graphical representations of relations, connecting simple and compound interest in financial contexts and determining probabilities of multiple experiments. *Fluency* includes formulating proofs using congruent triangles and angle properties, factorising and expanding algebraic expressions, using a range of strategies to solve equations and using calculations to investigate the shape of data sets. *Problem Solving* includes calculating the surface area and volume of a diverse range of prisms, finding unknown lengths and angles using applications of trigonometry, using algebraic and graphical techniques to find solutions to simultaneous equations and inequalities, and investigating independence of events and their probabilities. *Reasoning* includes formulating geometric proofs involving congruence and similarity, interpreting and evaluating media statements and interpreting and comparing data sets.

By the end of Year 10 students recognise the connection between simple and compound interest. They solve problems involving linear equations and inequalities. They make the connections between algebraic and graphical representations of relations. Students solve surface area and volume problems relating to composite solids. They recognise the relationships between parallel and perpendicular lines. Students apply deductive reasoning to proofs and numerical exercises involving plane shapes. They compare data sets by referring to the shapes of the various data displays. They describe bivariate data where the independent variable is time. Students describe statistical relationships between two continuous variables. They evaluate statistical reports. Students expand binomial expressions and factorise monic quadratic expressions. They find unknown values after substitution into formulas. They perform the four operations with simple algebraic fractions. Students solve simple quadratic equations and pairs of simultaneous equations. They use triangle and angle properties to prove congruence and similarity. Students use trigonometry to calculate unknown angles in right-angled triangles. Students list outcomes for multi-step chance experiments and assign probabilities for these experiments. They calculate quartiles and interquartile ranges.

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 Scorcher for review and revision.

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

Assessment:

Semester 2	Weighting	Timeline
Mid Term 3 Review	10%	Issued Week 3 of Term 3 – due Week 4 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

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 this time. **Term 3 is a short term in year 10 due to the Immersion Units that are offered.**

Term 3 week	TOPIC and Exercises	ACM Content Descriptors
1 – 3	**7 The Parabola** 7A Parabolas congruent to $y = x^2$ 7B Sketching the graph of the quadratic $y = x^2 + bx + c$ 7C Upside-down parabolas 7D The general quadratic $y = ax^2 + bx + c$ 7E Symmetry and factorisation 7F Applications involving quadratics	ACMNA 239 ACMNA 267
3	**Mid Term Review Issued**	
4	**Mid Term Review Due**	
3 – 4	**8 Review of Congruence and Similarity** 8A Review of triangles 8B Congruence 8C Enlargements and similarity 8D Similarity and intervals within a triangle	ACMMG 243 ACMMG 244
5	**17 Direct and Inverse Variation** 17A Direct proportion 17B Inverse proportion	ACMNA 208 ACMNA 239
6 – 7	**Revision Ch 7, 8 and 17**	
7	**Examination (1½ hours + 5 minutes perusal)**	

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Term 4 week	TOPIC and Exercises	ACM Content Descriptors
1 – 2	**19 Statistics** 19A The median and the interquartile range 19B Boxplots 19D The mean and the standard deviation 19E Interpreting the standard deviation 19F Time-series data 19G Bivariate data 19H Miscellaneous exercises	ACMSP 248 ACMSP 249 ACMSP 250 ACMSP 251 ACMSP 252 ACMSP 278 ACMSP 279
3 – 4	**12 Further Trigonometry** 12A Review of the basic trigonometric ratios 12B Exact values 12C Three-dimensional trigonometry 12I Area of a triangle	ACMMG 245 ACMMG 276
4	**Mid Term Review Issued**	
5	**Mid Term Review Due**	
5 – 6	**14 Circle Geometry** 14A Angles at the centre and the circumference 14B Angles at the circumference and cyclic quadrilaterals 14C Chords and angles at the centre 14D Tangents and radii 14E The alternate segment theorem 14F Similarity and circles	ACMMG 243 ACMMG 272 ACMMG 274
6 – 7	**16 Probability** 16A Review of probability 16B The complement, union and intersection 16C Conditional probability 16D Sampling with replacement and without replacement	ACMSP 246 ACMSP 247
7 – 8	**Revision Ch 19, 12, 14 and 16**	
8	**Examination (1½ hours + 5 minutes perusal)**	

ICE-EM MATHEMATICS
Australian Curriculum Edition
Year 10

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 10 Australia Curriculum Content Descriptors

Number and Algebra

(ACMNA229) Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies

(ACMNA264) Define rational and irrational numbers and perform operations with surds and fractional indices

(ACMNA265) Use the definition of a logarithm to establish and apply the laws of logarithms

(ACMNA230) Factorise algebraic expressions by taking out a common algebraic factor

(ACMNA231) Simplify algebraic products and quotients using index laws

(ACMNA232) Apply the four operations to simple algebraic fractions with numerical denominators

(ACMNA233) Expand binomial products and factorise monic quadratic expressions using a variety of strategies

(ACMNA234) Substitute values into formulas to determine an unknown

(ACMNA266) Investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems

(ACMNA235) Solve problems involving linear equations, including those derived from formulas

(ACMNA236) Solve linear inequalities and graph their solutions on a number line

(ACMNA237) Solve linear simultaneous equations, using algebraic and graphical techniques including using digital technology

(ACMNA238) Solve problems involving parallel and perpendicular lines

(ACMNA239) Explore the connection between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials

(ACMNA240) Solve linear equations involving simple algebraic fractions

(ACMNA241) Solve simple quadratic equations using a range of strategies

(ACMNA270) Solve simple exponential equations

(ACMNA267) Describe, interpret and sketch parabolas, hyperbolas, circles and exponential functions and their transformations

(ACMNA268) Apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation

(ACMNA269) Factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts

Measurement and Geometry

(ACMMG242) Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids

(ACMMG271) Solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids

(ACMMG243) Formulate proofs involving congruent triangles and angle properties

(ACMMG244) Apply logical reasoning, including the use of congruence and similarity, to proofs and numerical exercises involving plane shapes

(ACMMG272) Prove and apply angle and chord properties of circles

(ACMMG245) Solve right-angled triangle problems including those involving direction and angles of elevation and depression

(ACMMG273) Establish the sine, cosine and area rules for any triangle and solve related problems

(ACMMG274) Use the unit circle to define trigonometric functions, and graph them with and without the use of digital technologies

(ACMMG275) Solve simple trigonometric equations

(ACMMG276) Apply Pythagoras' theorem and trigonometry to solving three-dimensional problems in right-angled triangles

Statistics and Probability

(ACMSP246) Describe the results of two- and three-step chance experiments, both with and without replacements, assign probabilities to outcomes and determine probabilities of events. Investigate the concept of independence

(ACMSP247) Use the language of 'if ....then, 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language

(ACMSP277) Investigate reports of studies in digital media and elsewhere for information on their planning and implementation

(ACMSP248) Determine quartiles and interquartile range

(ACMSP249) Construct and interpret box plots and use them to compare data sets

(ACMSP250) Compare shapes of box plots to corresponding histograms and dot plots

(ACMSP251) Use scatter plots to investigate and comment on relationships between two numerical variables

(ACMSP252) Investigate and describe bivariate numerical data where the independent variable is time

(ACMSP253) Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data

(ACMSP278) Calculate and interpret the mean and standard deviation of data and use these to compare data sets

(ACMSP279) Use information technologies to investigate bivariate numerical data sets. If appropriate, use a straight line to describe the relationship, allowing for variation