EMMANUEL CATHOLIC COLLEGE
MATHEMATICS DEPARTMENT

Year 9
Pathway 3

STUDENT INFORMATION PACK

2018

Contents

This booklet contains:

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Course Statement

The Year 9 Mathematics Pathway 3 Course has been designed around the Australian Curriculum, which is being implemented Australia wide over the next few years.
While some of the references in the program are outside the Year 9 Australian Curriculum, the bulk of the course can be found here. All references refer to general capabilities mentioned in the Australian Curriculum.

Content descriptions broadly separate the work into the following categories: **NUMBER & ALGEBRA, MEASUREMENT & GEOMETRY** and **STATISTICS & PROBABILITY**. These are the content strands that will be assessed and reported on during and at the end of the course.

Resources

All students require access to the **Essential Mathematics for the Australian Curriculum 9 (Second Edition)**. This resource can be accessed by downloading the eBook onto the OfficeMax ReadCloud site. You can access the Cambridge Hotmaths website by entering a unique registration code.
The E-book, a pencil case and a document wallet containing a graph book, file paper, scientific calculator and a math aid set should be taken to each mathematics lesson. In particular, a document wallet will be essential for storing assessment items.

Assessments

These may include Tests and investigations. These tests may involve a calculator section and a calculator **free** section. Investigations may be in-class, out of class or both. All tests and assessments will be sent home once they have been marked for parents to view.

Homework

The Mathematics department at Emmanuel Catholic College recognises the importance of making links between home and school and encourages parental involvement with the learning of mathematics. Homework provides opportunities for children to:
- Practice and consolidate their skills and knowledge,

- Develop and extend their technique and strategies
- Share their mathematical work with their family, and
- Prepare for their future learning.

It is an expectation that Year 9 students should do at least 30 minutes of mathematics homework every night. If a student struggles with completing the work given for homework, teachers will expect a note from their parent or guardian stating clearly why their child was not able to complete their homework. Students are also encouraged to seek help from their teacher at the earliest possible opportunity.

Mental Skills and Literacy

Individual teachers will promote mental skills and literacy as part of their daily routine within the classroom through questioning, mental arithmetic, etc. Teachers may also engage students in suitable literacy and numeracy activities to assist them in their learning.

Year 9 Level Description

The proficiency strands *Understanding, Fluency, Problem Solving* and *Reasoning* are an integral part of mathematics content across the three content strands: *Number and Algebra, Measurement and Geometry, and Statistics and Probability.* 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 this year level:

Understanding includes describing the relationship between graphs and equations, simplifying a range of algebraic expressions, explaining the use of relative frequencies to estimate probabilities, and the use 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 and calculating areas of shapes and surface areas of prisms

Problem Solving includes formulating, and modelling practical situations involving 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 clarify situations, developing strategies in investigating similarity and sketching linear graphs

Content Descriptions

Elaborations of the content descriptors can be obtained from the ACARA or SCASA websites, or from your teacher. The codes shown in brackets should be used to link to the

elaborations.

Mathematics Achievement Standard

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 bi-modal 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 non-linear 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.

Program Notes

All exercises to be attempted through the course of the school year are listed in the following program.

Any exercise with (Con) following it is a revision exercise to remind students of past work before attempting new work.

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Assessment Outline Sem 1

Assessment Type	Assessment Type Weighting	Assessment Task Weighting	When	Assessment Task
Test	74%	9%	Term 1 Week 3	**Task 1: Skills 1 Test 1: Number (Simple Interest)**
		18%	Term 1 Week 6	**Task 2: Test 1: Number and Algebra**
		9%	Term 1 Week 10	**Task 4: Skills Test 2: Pythagoras and Trigonometry**
		18%	Term 2 Week 3	**Task 5 : Test 2: Pythagoras' theorem and trigonometry**
		20%	Term 2: Week 7	**Task 7: Semester Review Test Chapters 1 - 4**
Investigation	26%	13%	Term 1: Week 8	**Task 3: Investigation 1: Number & Algebra**
		13%	Term 2: Week 5	**Task 6: Investigation 2: Trigonometry (part 1- Take home section) (part 2- In class validation)**
Total	**100%**	100%		

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Assessment Outline Sem 2

Assessment Type	Assessment Type Weighting	Assessment Task Weighting	When	Assessment Task
Response	54%	18%	Term 3 Week 6	**Task 9 : Test 3: Measurement and Scientific Notation**
		9%	Term 3 Week 8	**Task 10: Skills Test 3: Probability**
		9%	Term 4 Week 4	**Task 12: Skills Test 4: Statistics**
		18%	Term 4 Week 6	**Task 13 : Test 4: Chance and Data**
Investigation	26%	13%	Term 3: Week 3	**Task 8: Investigation 3:**
		13%	Term 4: Week 3	**Task 11: Investigation 4: probability & statistics**
Examination	20	20%	Term 4: Week 8	**Task 14: Semester 2 Examination**
Total	**100%**	100%		

STUDENT RECORD OF ACHIEVEMENT

Use this table to record your marks as you receive them throughout the year. Remember to keep all of your assessments in a safe place.

Assessment Item	Task weighting	YOUR MARK	Parent Signature
Task 1: Skills 1 Test 1: Number (Simple Interest)	9%		
Task 2: Test 1: Number and Algebra	18%		
Task 3: Investigation 1: Number & Algebra	13%		
Task 4: Skills Test 2: Pythagoras and Trigonometry	9%		
Task 5 : Test 2: Pythagoras' theorem and Trigonometry	18%		
Task 6: Investigation 2:	13%		
Task 7: Semester Review Test Chapters 1 - 4	20%		
Task 8: Investigation 3:	13%		
Task 9 : Test 3: Measurement and Scientific Notation	18%		
Task 10: Skills Test 3: Probability	9%		
Task 11: Investigation 4: probability & statistics	13%		
Task 12: Skills Test 4: Statistics	9%		
Task 13 : Test 4: Chance and Data	18%		
Task 14: Semester 2 Examination	20%		

Year 9 Pathway 3 Program 2018

RESOURCE: ESSENTIAL MATH FOR THE AUSTRALIAN CURRICULUM: CAMBRIDGE PRESS

Week	TERM 1 CONTENT OUTLINE	Expected Learning or Elaborations	RESOURCES	ASSESSMENT
1.1-1.3	**Introduction:** Course content, assessment program and structure. **Money and financial mathematics** Solve problems involving simple interest (ACMNA211)	• understanding that financial decisions can be assisted by mathematical calculations	<u>Chapter 1</u> <u>Percentages and Money Review</u> Ex 1F Numbers (1 – 3), 9(a-d), 14, 15, 20 <u>Simple Interest</u> Ex 1J Numbers (1 – 12), 15	<u>Skills Test 1</u> <u>(9%)</u>
1.4-1.6	**Patterns and algebra** Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate (ACMNA213) **Linear and non-linear relationships** Sketch linear graphs using the coordinates of two points and solve linear equations (ACMNA215)	• understanding that the distributive law can be applied to algebraic expressions as well as numbers • understanding the relationship between expansion and factorisation and identifying algebraic factors in algebraic expressions • Solve simple Linear Equations	<u>Chapter 2</u> <u>Review Algebraic Expressions</u> Ex 2A Numbers (1 – 5), 6(a –d), 7(a –d), 10, 11, 13 <u>Collecting Like Terms</u> Ex 2B (1 -3), 4, 5, 9, 10, 12, 13, 14, 15 <u>Use the distributive Law to expand algebraic expressions</u> Ex 2C Numbers(1 – 5), 8 , 9 12(a – d), 13(a – d) <u>Solve Simple Linear Equations</u> Ex 2D (1 – 7)	**Test 1** **Week 6** **Chapter 1 & 2** **(18%)**

1.7-1.11	**Pythagoras and trigonometry** Investigate Pythagoras' Theorem and its application to solving simple problems involving right angled triangles (ACMMG222) Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles (ACMMG223) Apply trigonometry to solve right-angled triangle problems (ACMMG224)	• understanding that Pythagoras' Theorem is a useful tool in determining unknown lengths in right-angled triangles and has widespread applications • recognising that right-angled triangle calculations may generate results that can be integers, fractions or irrational numbers • developing understanding of the relationship between the corresponding sides of similar right-angled triangles • understanding the terms adjacent and opposite sides in a right-angled triangle • selecting and accurately using the correct trigonometric ratio to find unknown sides (adjacent, opposite and hypotenuse) and angles in right-angled triangles	Chapter 3 Pythagoras' Theorem Ex 3A, 3B, 3C Using the Trig Ratios to find the lengths of sides and angles in right-angled triangles. Ex 3E, 3H Applying Trigonometry Ex 3I	**Investigation 1** **Week 8** **(13%)** **Skills Test 2** **(9%)**
		Weeks 9- 11 will include Naplan Revision : The content may continue in Term 2		
END OF TERM 1				

Week	TERM 2 CONTENT OUTLINE	Expected Learning or Elaborations	RESOURCES	ASSESSMENT
2.1-2.3	**Pythagoras and trigonometry**	Review /Continuation and Preparation for Test	Chapter 3 Pythagoras' Theorem and Trigonometry NAPLAN REVISION	**Test 2** **Week 3** **(18%)**
2.4-2.9	**Linear and non-linear relationships** Sketch linear graphs using the coordinates of two points and solve linear equations (ACMNA215) Find the distance between two points located on a Cartesian plane using a range of strategies, including graphing software (ACMNA214) Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software (ACMNA294)	• determining linear rules from suitable diagrams, tables of values and graphs and describing them using both words and algebra • recognising that the gradient of a line is the same as the gradient of any line segment on that line • investigating graphical and algebraic techniques for finding distance between two points • using Pythagoras' theorem to calculate distance between two points • investigating graphical and algebraic techniques for finding midpoint and gradient	Chapter 4 Ex 4(A – G) Ex 4H	**Investigation 2** **Week 5** **(13%)** **Semester 1 Test** **Week 8** **(10% Chapter 4)** **(10% Chapters 1- 3)**
	END OF TERM 2			

Week	TERM 3 CONTENT OUTLINE	Expected Learning or Elaborations	RESOURCES	ASSESSMENT
3.1-3.4	**Using units of measurement** Calculate the areas of composite shapes (ACMMG216) Calculate the surface area and volume of cylinders and solve related problems (ACMMG217) Solve problems involving the surface area and volume of right prisms (ACMMG218)	• understanding that partitioning composite shapes into rectangles and triangles is a strategy for solving problems involving area • analysing nets of cylinders to establish formulas for surface area • connecting the volume and capacity of a cylinder to solve authentic problems • solving practical problems involving surface area and volume of right prisms	Revise area of the following shapes: squares, rectangles, triangles and circles (semi-and quarter included) Convert Units Ex 5(A - C) Areas of Composite Shapes Ex 5E Surface Area and Volume Ex 5 F – 5H	**Investigation 3** **Week 3** **(13%)**
3.5-3.6	**Real numbers** Express numbers in scientific notation (ACMNA210) **Measurement and Geometry** Investigate very small and very large time scales and intervals (ACMMG219)	• representing extremely large and small numbers in scientific notation, and numbers expressed in scientific notation as whole numbers or decimals • the usefulness of scientific notation in representing very large and very small numbers	Scientific Notation Ex 6F Enlargement and Scale Factor Ex 7F	**Test 3** **Week 6** **Chapters 5 , 6 & 7** **(18%)**

| 3.7 – 3.10 | **Statistics and Probability**
Chance
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 (ACMSP225)

Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or' (ACMSP226)

Investigate reports of surveys in digital media and elsewhere for   information on how data were obtained to estimate population means and medians (ACMSP227) | • conducting two-step chance experiments

• using systematic methods to list outcomes of experiments and to list outcomes favourable to an event

• comparing experiments which differ only by being undertaken with replacement or without replacement

• using Venn diagrams or two-way tables to calculate relative frequencies of events involving 'and', 'or' questions

• using relative frequencies to find an estimate of probabilities of 'and', 'or' events

• investigating a range of data and its sources, for example the age of residents in Australia, Cambodia and Tonga; the number of subjects studied at school in a year by 14-year-old students in Australia, Japan and Timor-Leste | Ex 9 (A – F) | **Skills Test 3 (9%)** |
| | | **END OF TERM THREE** | | |

Week	TERM 4 CONTENT OUTLINE	Expected Learning or Elaborations	RESOURCES	ASSESSMENT
4.1-4.4	**Statistics and Probability** **Data representation and interpretation** Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly from secondary sources (ACMSP228) Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi modal' (ACMSP282) Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread(ACMSP283)	• comparing the annual rainfall in various parts of Australia, Pakistan, New Guinea and Malaysia • using stem-and-leaf plots to compare two like sets of data such as the heights of girls and the heights of boys in a class • describing the shape of the distribution of data using terms such as 'positive skew', 'negative skew' and 'symmetric' and 'bi-modal' • comparing means, medians and ranges of two sets of numerical data which have been displayed using histograms, dot plots, or stem and leaf plot	Measures of Centre Ex 9G Stem and Leaf Plots Ex 9H Data displayed as histograms Ex 9I (skewed, symmetrical,bimodal, outliers, clusters, denseness, gaps) Measures of Spread Ex 9J	**Investigation 4** **Week 3** **(13%)** **Skills Test 4** **%)**
4.5-4.6	Chance and Data Revision for Test and Semester Test			**Test 4** **Week 6** **(18%)**
4.7 – 4.8	**Year 9 Exam Week 8**		Review	**Semester 2 Test** **Week 8** **Chapters 6 -10** **(20%)**
4.9	**Yearly Review**			
	END OF TERM 4			