

General Mathematics Units 3 & 4

Contents

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Series contents

This series comprises **eleven content workbooks**, **topic tests** at the end of each of the four topics, and a **practice-examination booklet**, covering the complete VCAA General Mathematics Units 3 & 4 course. Each content workbook follows the same structure: concise theory, scaffolded and unscaffolded worked examples, graded practice questions, a compact answer key, and fully-worked solutions.

Topic 1 — Data analysis

Chapter 1 — Investigating data distributions (78 pp)

1A Types of data · 1B Displaying and describing categorical data · 1C Displaying and describing numerical data · 1D Dot plots and stem plots · 1E Using a logarithmic (base 10) scale to display data · 1F Measures of centre and spread · 1G Boxplots and comparing distributions · 1H The normal distribution and the 68–95–99.7% rule

Chapter 2 — Investigating association between two variables (102 pp)

2A Response and explanatory variables · 2B Associations between two categorical variables · 2C Association between a numerical and a categorical variable · 2D Associations between two numerical variables · 2E Interpreting a scatterplot · 2F The correlation coefficient · 2G The coefficient of determination · 2H Correlation and causation · 2I Choosing an appropriate graph

Chapter 3 — Investigating and modelling linear associations (36 pp)

3A Fitting a least-squares line · 3B Interpreting and using the least squares line · 3C Residual analysis and quality of fit

Chapter 4 — Data transformation (46 pp)

4A The squared transformation · 4B The logarithmic (base 10) transformation · 4C The reciprocal transformation · 4D Selecting a transformation to linearise data

Chapter 5 — Investigating and modelling time series (60 pp)

5A Time series data · 5B Smoothing a time series using moving means · 5C Smoothing a time series using moving medians · 5D Seasonal indices · 5E Fitting a trend line and forecasting

Topic 1 Test A (multiple-choice) and Test B (short-answer), with fully-worked solutions, are included at the end of this workbook.

Topic 2 — Recursion and financial modelling

Chapter 6 — Modelling growth and decay with recurrence relations (47 pp)

6A Sequences and recurrence relations · 6B Modelling linear growth and decay with recursion · 6C An explicit rule for linear growth and decay · 6D Modelling geometric growth and decay with recursion · 6E An explicit rule for geometric growth and decay · 6F Nominal and effective interest rates

Chapter 7 — Reducing-balance loans, annuities and investments (107 pp)

7A Compound interest investments with regular additions · 7B Modelling reducing-balance loans and annuities · 7C Amortisation tables · 7D Interpreting and applying amortisation tables · 7E Using a finance solver: balances and final payments · 7F Using a finance solver to find the payment, rate and time · 7G Solving multi-stage financial problems · 7H Interest-only loans · 7I Perpetuities

Topic 2 Test A (multiple-choice) and Test B (short-answer), with fully-worked solutions, are included at the end of this workbook.

Topic 3 — Matrices

Chapter 8 — Matrices (72 pp)

8A Order, elements and types of matrices · 8B Using matrices to represent information · 8C Matrix addition, subtraction and scalar multiplication · 8D Matrix multiplication and powers · 8E The inverse and determinant of a matrix · 8F Binary, permutation and communication matrices · 8G Dominance matrices

Chapter 9 — Transition matrices (71 pp)

9A Constructing a transition matrix · 9B Interpreting transition matrices · 9C Matrix recurrence relations and the steady state · 9D Modelling populations with culling and restocking · 9E Leslie matrices and population modelling

Topic 3 Test A (multiple-choice) and Test B (short-answer), with fully-worked solutions, are included at the end of this workbook.

Topic 4 — Networks and decision mathematics

Chapter 10 — Graphs, networks and trees (88 pp)

10A Graphs and networks · 10B Adjacency matrices · 10C Exploring and travelling · 10D Weighted graphs and networks · 10E Dijkstra's algorithm · 10F Trees and minimum connector problems

Chapter 11 — Flow, matching and scheduling problems (90 pp)

11A Flow problems · 11B Matching and allocation problems · 11C Precedence tables and activity networks · 11D Scheduling and the critical path · 11E Crashing to reduce the completion time

Topic 4 Test A (multiple-choice) and Test B (short-answer), with fully-worked solutions, are included at the end of this workbook.

Practice examinations

Chapter 12 — Practice Examinations (82 pp)

Six full practice examinations with fully-worked solutions, cumulative over the whole course:

Practice Exams 1–3 — Multiple-choice (Exam 1 style: 40 multiple-choice questions, 40 marks, 1 hour 30 minutes writing), at increasing difficulty · Practice Exams 4–6 — Short-answer (Exam 2 style: 60 marks, 1 hour 30 minutes writing), at increasing difficulty. Every examination is open-book (one bound reference permitted) with an approved CAS technology permitted throughout.

The series comprises ≈ 882 pages across all booklets.