

Mathematics Level 9

Contents

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Contents

This book is the **Mathematics Level 9** student workbook. It is written for **Level 9** of the Victorian Curriculum F–10 Version 2.0 (VC2), Mathematics — Year 9 in Victorian schools. **One year level, not a band.** Every content description in this book is a Level 9 content description: Level 8 is assumed behind the students and is never re-taught, and Level 10 is deliberately set up but never taught. The book is complete at 24 content descriptions.

It is one book in a per-level series (Foundation, then Levels 1 to 10), built one classroom year at a time from VCAA's per-level authority files. For a Year 9 classroom it is the whole of the year's mathematics: all 24 Level 9 content descriptions are owned here, in full and at full depth — for a Year 9 teacher it is the only book on the desk.

The series is ten booklets:

- **Chapter 1 — Number and Algebra: real numbers, exponents and algebraic expressions** — Maths9_Chapter01 — subtopics 1A–1C: the real number system, rational and irrational numbers, exact and approximate; the exponent laws with integer and zero exponents, extended to variables; and expanding binomial products and factorising monic quadratic expressions. Test T1 — Part A technology-free, Part B technology-active — with answers and fully worked solutions, is at the back (60 pp)
- **Chapter 2 — Algebra: linear relationships and the Cartesian plane** — Maths9_Chapter02 — subtopics 2A and 2B: sketching linear graphs from 2 points and solving linear equations, and gradient, midpoint and distance on the Cartesian plane. Test T2, with answers and fully worked solutions, is at the back (44 pp)
- **Chapter 3 — Algebra: quadratic functions, parameters and modelling change** — Maths9_Chapter03 — subtopics 3A–3C: quadratic functions, their graphs and the null factor law; varying the parameters of linear and quadratic graphs; and a full modelling cycle with linear and quadratic functions, including simple interest. Test T3, with answers and fully worked solutions, is at the back (63 pp)
- **Chapter 4 — Space: similarity, the trigonometric ratios and geometric algorithms** — Maths9_Chapter04 — subtopics 4A–4C: similar right-angled triangles and the constancy of the sine, cosine and tangent ratios; the enlargement transformation and what it preserves; and designing, testing and refining algorithms from geometric constructions and theorems. Test T4, with answers and fully worked solutions, is at the back (58 pp)
- **Chapter 5 — Measurement** — Maths9_Chapter05 — subtopics 5A–5E: volume and surface area of right prisms, cylinders and composite objects; scientific notation; spatial problems with angle properties, scale, similarity, ratio, Pythagoras' theorem and trigonometry; absolute, relative and percentage error; and modelling with direct proportion, rates, ratio and scale. Test T5, with answers and fully worked solutions, is at the back (91 pp)
- **Chapter 6 — Statistics** — Maths9_Chapter06 — subtopics 6A–6E: comparing distributions; choosing and justifying a data display; reading survey reports and estimating population means and medians; sampling methods, sample-to-sample variation and representation that promotes a point of view; and planning and conducting a statistical investigation. Test T6, with answers and fully worked solutions, is at the back (108 pp)
- **Chapter 7 — Probability** — Maths9_Chapter07 — subtopics 7A–7C: two-step chance experiments with and without replacement; relative frequency and events joined by 'and', inclusive 'or' and exclusive 'or'; and repeated chance experiments and simulations with digital tools. Test T7, with answers and fully worked solutions, is at the back (59 pp)
- **Chapter 8 — Extended tasks** — Maths9_Chapter08_Tasks — the three tasks a timed test cannot evidence: X1 a statistical investigation (VC2M9ST05), X2 modelling with direct proportion, rates, ratio and scale (VC2M9M05), and X3 modelling change with a linear or quadratic model, including simple interest (VC2M9A06). Each is a structured brief with planning frames, a data-quality checklist, a five-criterion rubric and a fully-worked exemplar (31 pp)
- **Chapter 9 — End-of-book review** — Maths9_Chapter09_Review — the Year 9 exit check across all 24 content descriptions and all six strands, sectioned by strand, in two parts — Part A technology-free, Part B technology-active — sat separately, with answers and fully worked solutions (32 pp)
- **Chapter 0 — Contents** — Maths9_Chapter00_Contents — this booklet: how to use the book, what it covers, teacher notes and safety notes (0 pp)

How to use this book

The chapters follow the strands, with one deliberate departure. Number carries a single content description at this level, so it is chaptered alongside Algebra rather than given a one-subtopic chapter of its own; otherwise the chapters run Number $\rightarrow$ Algebra $\rightarrow$ Space $\rightarrow$ Measurement $\rightarrow$ Statistics $\rightarrow$ Probability, except that **Space precedes Measurement**. The reason is a genuine teaching dependency: 4A derives the constancy of the sine, cosine and tangent ratios from similarity, and 5C is the subtopic that applies them to spatial problems. Teaching the application before the derivation makes trigonometry a memorised acronym. No chapter mixes strands, and no other order is reversed.

Chapter order is a teaching order, with two named adjustments. The prerequisite pointers the book relies on are: 1C uses 1B's exponent conventions; 3A applies 1C's factorisation; 3B and 3C vary and choose between the graphs of 2A and 3A; 4A connects the tangent of an angle back to 2B's gradient; 5B is 1B's exponent laws applied to measurement; 5C applies 4A's ratios, 4B's scale factor and 2B's distance result; 5D builds on 5B's instrument accuracy; 5E uses 4B's scale factor and 2A's linear graphs; 6B needs 6A's feature names; 6E runs on the whole of 6A–6D; and 7B and 7C assign probabilities over the outcome sets built in 7A. Two adjustments: **teach 5B and 5D consecutively** (instrument accuracy sets up absolute and relative error), which places 5C between 4C and 5B or after 5D; and run the extended tasks alongside their hosts — X3 alongside 3C, X2 alongside 5E, X1 alongside 6E — over about two to three lessons each. One recommended sequence:

1A $\rightarrow$ 1B $\rightarrow$ 1C $\rightarrow$ 2A $\rightarrow$ 2B $\rightarrow$ 3A $\rightarrow$ 3B $\rightarrow$ 3C $\rightarrow$ 4A $\rightarrow$ 4B $\rightarrow$ 4C $\rightarrow$ 5A $\rightarrow$ 5B $\rightarrow$ 5D $\rightarrow$ 5C $\rightarrow$ 5E $\rightarrow$ 6A $\rightarrow$ 6B $\rightarrow$ 6C $\rightarrow$ 6D $\rightarrow$ 6E $\rightarrow$ 7A $\rightarrow$ 7B $\rightarrow$ 7C

One content description per subtopic. Each of the 24 subtopics owns exactly one VC2 content description, quoted by its verbatim code, and its teaching sequence is built to deliver that content description in full. VCAA's elaborations — the examples it suggests for what a content description might look like — are carried in each subtopic's header for linkage and coverage, not as a checklist to work through and not as a teaching sequence. A subtopic that delivers its content description through other contexts is correct, not under-covered.

Subtopics carry a size marker. Level 9 content descriptions are wildly uneven — VC2M9A03 names one elaboration while VC2M9M03 names angle properties, scale, similarity, ratio, Pythagoras' theorem and trigonometry in a single sentence — so each subtopic is **S** (standard) or **E** (extended, authored at double the worked examples and double the question set, in one file with one owner). Eleven subtopics are standard and thirteen are extended. The marker is a size instruction, not a split.

The shape of every subtopic. Each subtopic opens with its content description code and text quoted word for word, its corrected achievement-standard anchor, and its prerequisite pointer. Then:

- **Theory** — the teaching sequence, carried by the diagram, the number line, the graph and the table as much as by the prose.
- **Worked examples** — first scaffolded in a two-column layout, then unscaffolded, each closing with a concluding $\therefore$ line.
- **Practice questions** — scaffolded first, then unscaffolded.
- **Answers**, then fully worked solutions with diagrams, so a student can check the method, not just the result.

A subtopic is not one lesson. Each of the 24 subtopics is several lessons of work. The subtopic is the unit of teaching and the unit of audit — “was VC2M9ST03 delivered?” is answerable by opening one file.

Assumed and set up, not taught. Level 8 is assumed: a teaching sequence may rehearse an assumed skill in its first minutes — 5C cannot apply Pythagoras' theorem without restating it, and 4A cannot establish ratio constancy without Level 8 similarity — but it does not teach an assumed skill as new content and does not assess it as a Level 9 outcome. The three load-bearing Level 8 results the whole of Chapters 2–5 rest on are Pythagoras' theorem, similarity, and

linear expressions. Level 10 destinations are named in teacher notes so you can see where the work leads; they are not taught here either.

Digital tools are named by class, and the content description sets the status. Five content descriptions name digital tools. 3B (parameters) and 7C (simulation) are **compulsory** — a hand-drawn substitute has not delivered them. 1A teaches and assesses both paths, with and without digital tools, because its content description requires both. In 3A and 4B the tools are permitted, not required. Tools are always named by class — scientific calculator, spreadsheet, graphing tool, dynamic geometry software, or a general-purpose programming language — never by product, so the book does not rot with a software release. **There is no CAS anywhere in this book:** CAS is a VCE tool.

The notation in this book. Subtraction uses a proper minus – (U+2212), never a hyphen — negative exponents, negative gradients, negative coordinates and negative rational numbers are all core content here, and the glyph is content, not typography. Multiplication is $\times$ in arithmetic and implied in algebra ($3x$, not $3 \times x$); division is $\div$ in arithmetic and the fraction bar in algebra; $\therefore$ opens a concluding line; $\approx$ marks an approximation; exponents are true superscripts (cm^3 , never cm3); ratios are 2:3 with no spaces; SI symbols follow a non-breaking space and are never pluralised (5 km, not 5 kms). Exact answers stay in surd or π form wherever the content description calls for exact representation, with a decimal approximation given only when asked and the rounding stated. Round once, at the end, and set out solutions one step per line, never chained equals.

The terminology is VCAA's. “Exponent laws”, never “index laws” — the synonym is noted once, in 1B, because students meet it in VCE, and never again. “Pythagoras’ theorem” with the apostrophe after the s. “Null factor law”, as VC2M9A05 writes it. Shape-of-distribution vocabulary exactly as VCAA gives it: ‘positive skew’, ‘negative skew’, ‘symmetric’, ‘bi-modal’. Australian spelling throughout — *metre, litre, centre, modelling, analyse, recognise, practise* (verb) / *practice* (noun) — and *maths*, never “math”.

The reading stays at Year 9. General vocabulary is held at or below a Year 9 ceiling so the difficulty lands on the mathematics, not on the reading. Every curriculum term and every subject-specific term is defined at first use; a contested term is never used as though its meaning were settled without saying whose definition is in play.

Everything real is really real. Every real datum in the book — a rainfall figure, a temperature, a wage, a price, a rate, a population — carries a source line with a retrieval date, is Victorian or Australian, and is dated within the currency window with an as at <Month YYYY> stamp; anything older is labelled HISTORICAL and used for trend or comparison only. Metric units, GST at 10%, Australian dollars, °C, southern-hemisphere seasons, dates as 7 August 2026, Year 9 not “9th grade”. Where a context is invented it is transparently labelled SCENARIO and built on real parameters; no invented statutes, communities, organisations, schools, businesses or People.

Level discipline — what this book keeps out. Level 9 sits two years from VCE Unit 1, and the boundary is easy to breach, so the enforced bans are stated once, here. Every one is a Level 10 or VCE topic:

- quadratics are **monic with integer roots**, solved by the null factor law — no quadratic formula, no completing the square as a solving method, no non-monic factorisation (the completed square appears in 3B only as a graph form, $y = a(x - h)^2 + b$);
- no simultaneous equations — 3C's call-out-fee and purchase-combination contexts are compared graphically or by a table of values, and the intersection is read, not solved;
- parallel and perpendicular gradients are demonstrated in 2B, not applied as a problem-solving technique;
- no linear-inequality unit — 1A may show a solution interval on the number line to illustrate the real number line, and that is all;
- trigonometry is right-angled only — no sine rule, no cosine rule, no angles of elevation or depression, no bearings;
- scientific notation, not logarithmic scales — no decibel, pH or Richter scale to read;
- exponents are integers — including negative — and the zero exponent, never fractional;
- algorithms use theorems; they do not prove them — no deductive proof, and no networks in any form;
- statistics uses mean, median and range — no quartiles, no interquartile range, no boxplots, no scatterplots, no line of good fit;
- chance experiments are two-step — the one three-stage tree in 7A is a labelled extension and is not assessed — and there is no conditional probability;

- modelling is direct proportion only and interest is simple only — no inverse proportion, no compound interest;
- nothing from VCE: no key knowledge, no notation, no exam item, no CAS.

Which book is which. This is the single-level Year 9 book. The Levels 9–10 band book is a separate product for composite Year 9/10 classes; it covers the same 24 content descriptions, the overlap is deliberate and total, and neither book defers anything to the other. The two share a curriculum, not a sentence.

The checks are school-designed. Seven topic tests, three extended tasks and one end-of-book review — all school-marked, all reported against the Level 9 achievement standard. See the teacher notes below for administration.

What this book covers

The table below is the coverage register for this book, reproduced from the series plan without change: all 24 content descriptions of VC2 Mathematics Level 9, each against the subtopic that owns it, with its elaboration ids fully expanded, its current question-bank count, and its corrected achievement-standard anchor. **Each code appears exactly once as an owner. There are no unowned codes and no code is owned twice.** Rows are sorted by strand then code — the authority file’s order is not numeric — so a coverage audit can diff this table directly. This is the table the series coverage audit checks, both directions: authority → book (each code has exactly one owning subtopic, and that subtopic delivers the whole content description) and book → authority (no subtopic claims a code it does not own, and no subtopic teaches content whose only home is Level 8, Level 10 or VCE).

#	CD code	Strand	Owner	Wt	Elaboration ids	MCQs	AS
1	VC2M9N0 1	Number	1A	S	VC2M9N0 1.E01, VC2M9N0 1.E02, VC2M9N0 1.E03, VC2M9N0 1.E04, VC2M9N0 1.E05	21	AS 1
2	VC2M9A0 1	Algebra	1B	S	VC2M9A0 1.E01, VC2M9A0 1.E02, VC2M9A0 1.E03, VC2M9A0 1.E04, VC2M9A0 1.E05, VC2M9A0 1.E06, VC2M9A0 1.E07	403	AS 2 † (D6 — CD governs)
3	VC2M9A0 2	Algebra	1C	E	VC2M9A0 2.E01, VC2M9A0 2.E02, VC2M9A0 2.E03	127	AS 3
4	VC2M9A0	Algebra	2A	E	VC2M9A0	94	AS 4

#	CD code	Strand	Owner	Wt	Elaboration ids	MCQs	AS
3					3.E01		
5	VC2M9A0 4	Algebra	2B	S	VC2M9A0 4.E01, VC2M9A0 4.E02, VC2M9A0 4.E03, VC2M9A0 4.E04, VC2M9A0 4.E05	103	AS 4
6	VC2M9A0 5	Algebra	3A	E	VC2M9A0 5.E01, VC2M9A0 5.E02, VC2M9A0 5.E03, VC2M9A0 5.E04, VC2M9A0 5.E05, VC2M9A0 5.E06, VC2M9A0 5.E07	21	AS 6
7	VC2M9A0 6	Algebra	3C	E	VC2M9A0 6.E01, VC2M9A0 6.E02, VC2M9A0 6.E03, VC2M9A0 6.E04, VC2M9A0 6.E05, VC2M9A0 6.E06	18	AS 5 † (file says AS 12 — transposed , D7)
8	VC2M9A0 7	Algebra	3B	S	VC2M9A0 7.E01, VC2M9A0 7.E02, VC2M9A0 7.E03	9	AS 7
9	VC2M9M0 1	Measurem ent	5A	E	VC2M9M0 1.E01, VC2M9M0 1.E02, VC2M9M0 1.E03, VC2M9M0 1.E04	15	AS 8

#	CD code	Strand	Owner	Wt	Elaboration ids	MCQs	AS
10	VC2M9M0 2	Measurement	5B	S	VC2M9M0 2.E01, VC2M9M0 2.E02, VC2M9M0 2.E03	9	AS 13
11	VC2M9M0 3	Measurement	5C	E	VC2M9M0 3.E01, VC2M9M0 3.E02, VC2M9M0 3.E03, VC2M9M0 3.E04, VC2M9M0 3.E05, VC2M9M0 3.E06	24	AS 9 + AS 11 † (orphan restored, D7)
12	VC2M9M0 4	Measurement	5D	S	VC2M9M0 4.E01, VC2M9M0 4.E02, VC2M9M0 4.E03, VC2M9M0 4.E04	12	AS 10
13	VC2M9M0 5	Measurement	5E	E	VC2M9M0 5.E01, VC2M9M0 5.E02, VC2M9M0 5.E03, VC2M9M0 5.E04, VC2M9M0 5.E05	18	AS 12 † (file says AS 5 — transposed , D7)
14	VC2M9SP 01	Space	4A	S	VC2M9SP 01.E01, VC2M9SP 01.E02, VC2M9SP 01.E03, VC2M9SP 01.E04	12	AS 9 + AS 11 † (orphan restored, D7)
15	VC2M9SP 02	Space	4B	S	VC2M9SP 02.E01, VC2M9SP 02.E02, VC2M9SP 02.E03	9	AS 14
16	VC2M9SP	Space	4C	E	VC2M9SP	9	AS 15

#	CD code	Strand	Owner	Wt	Elaboration ids	MCQs	AS
	03				03.E01, VC2M9SP 03.E02, VC2M9SP 03.E03		
17	VC2M9ST 01	Statistics	6C	S	VC2M9ST 01.E01, VC2M9ST 01.E02, VC2M9ST 01.E03, VC2M9ST 01.E04, VC2M9ST 01.E05	15	AS 17
18	VC2M9ST 02	Statistics	6D	E	VC2M9ST 02.E01, VC2M9ST 02.E02, VC2M9ST 02.E03	9	AS 17
19	VC2M9ST 03	Statistics	6A	E	VC2M9ST 03.E01, VC2M9ST 03.E02, VC2M9ST 03.E03, VC2M9ST 03.E04, VC2M9ST 03.E05	15	AS 16
20	VC2M9ST 04	Statistics	6B	S	VC2M9ST 04.E01, VC2M9ST 04.E02, VC2M9ST 04.E03, VC2M9ST 04.E04	12	AS 16
21	VC2M9ST 05	Statistics	6E	E	VC2M9ST 05.E01, VC2M9ST 05.E02, VC2M9ST 05.E03, VC2M9ST 05.E04	12	AS 17
22	VC2M9P0 1	Probability	7A	E	VC2M9P0 1.E01, VC2M9P0 1.E02,	12	AS 18

#	CD code	Strand	Owner	Wt	Elaboration ids	MCQs	AS
					VC2M9P0 1.E03, VC2M9P0 1.E04		
23	VC2M9P0 2	Probability	7B	E	VC2M9P0 2.E01, VC2M9P0 2.E02	9	AS 19
24	VC2M9P0 3	Probability	7C	S	VC2M9P0 3.E01, VC2M9P0 3.E02, VC2M9P0 3.E03, VC2M9P0 3.E04	12	AS 20
24 CDs			24 subtopics	11 S · 13 E	100 elaborations	1,000	20 of 20 AS sentences anchored

Source: codes, strands, elaboration ids and question-bank counts quoted from `maths_9.json`, the Level 9 authority file (VCAA export retrieved 2026-07-29; provenance machine-verified 2026-08-07 — 100 VC2M9* rows, 24 distinct codes, all 24 description strings verbatim, 0 mismatches).

Notes on this table:

- **The AS column is the corrected mapping.** VCAA publishes the Level 9 achievement standard as one block of 20 sentences, and the per-CD extract in the authority file is a derivation that is wrong in three places; rows marked † are where this register differs from the authority file — the series plan records the defects as its decisions D6 and D7 — and the register governs for every rubric and reporting job in this book:
 - VC2M9A01 (1B): the file’s extract says “positive integers”, but the content description says “integer exponents” and the elaborations work negative exponents explicitly — **the content description governs**, and 1B teaches negative integer exponents;
 - VC2M9A06 (3C) and VC2M9M05 (5E): their extracts are transposed in the file — this register anchors 3C to AS 5 and 5E to AS 12, the right way round;
 - sentence 11 — “Students apply Pythagoras’ theorem and use trigonometric ratios to solve problems involving right-angled triangles” — is claimed by no content description in the raw file and is restored here to 4A and 5C. Without this, the trigonometry outcome cannot be reported at all.
- **The Elaboration ids column is the full set VCAA gives for each code** — this is what joins the book to the question bank. Elaborations are illustrations of what a content description might look like, not the content description itself: the content description is the expectation, and a subtopic that delivers its code through other contexts has still taught the curriculum.
- **Eight elaborations are held back and are not taught in this book.** They are the eight that carry Aboriginal and Torres Strait Islander content: VC2M9M01.E04, VC2M9A05.E07, VC2M9A06.E06, VC2M9M05.E05, VC2M9ST02.E03, VC2M9ST03.E04, VC2M9ST05.E04 and VC2M9P03.E04. They are held back under the estate’s content policy because accuracy cannot be guaranteed, and it is better to be respectful than cover the entire curriculum inaccurately. The notice on the first page of every booklet in this series says this, and each affected subtopic records the exclusion in its own header so the coverage audit reports it as accepted, never silently dropped. **No content description loses its teaching context** — every code is still delivered in full by its subtopic.

- **The counts close.** 24 codes, 24 owners — every code is owned exactly once, with no unowned code and no code owned twice. 100 elaboration ids and 1,000 banked questions keyed to these codes, and all 20 achievement-standard sentences anchored. No code is deferred to another book: `_build8` owns the Level 8 codes and `_build10` the Level 10 codes, and nothing here is handed off to them or borrowed from them.
- **The bank is uneven, and that is not an error.** Algebra holds 775 of the 1,000 items and VC2M9A01 alone holds 403, while six codes — VC2M9A07, VC2M9M02, VC2M9SP02, VC2M9SP03, VC2M9ST02 and VC2M9P02 — hold 9 each. Every code has some bank support and no code has none, so the join is live across all 24 codes; thin support is a note to whoever extends the bank, not a defect in this book, and no subtopic is resized because of it.

What this book does not cover. Level 8 content belongs to the Level 8 book and Level 10 content to the Level 10 book: this book rehearses Level 8 skills and sets up Level 10 destinations, and teaches and assesses neither. The same 24 content descriptions also appear in the Levels 9–10 band book; that overlap is deliberate — two products covering one year level — and neither book defers anything to the other. Towards Foundation Mathematics (Levels A–D) is a separate product for students with disability working below Foundation level, and none of its outcomes is referenced, mapped or assessed here. VCE content is nowhere in this book: the series plan carries a forward map to the four VCE mathematics studies, and it is reference-only — no VCE key knowledge, notation or exam item enters a Level 9 subtopic, and no subtopic is widened to “prepare for VCE”.

Teacher notes

Read the level. Everything in this book is school-designed and school-marked. VC2 reports achievement against the **achievement standard**, not against a mark; the marks below exist so a school can build its own reporting and so students meet a mark-allocated paper before VCE. Every paper carries this standing notice:

This is a school-designed paper. It is not a VCAA instrument. Achievement in the Victorian Curriculum is reported against the Level 9 achievement standard, not against a mark on this paper.

The papers are pitched for Year 9 — more formal than the 7–8 band: working is shown, reasoning is marked separately from the answer where the content description requires reasoning, and papers run 20–45 minutes. Not yet a VCE-length exam.

Every test and the review are in two parts, because the curriculum itself is split this way: five content descriptions name digital tools and VC2M9N01 requires problems solved with and without them.

- **Part A — technology-free.** Exact values, algebraic manipulation, by-hand computation, reading a graph, stating a reason, tracing an algorithm.
- **Part B — technology-active.** Scientific calculator, spreadsheet, graphing tool, dynamic geometry software or a programming language, as nominated by the teacher. **No CAS.**

The marking rule, so delivery can be read off the mark schedule. Standard subtopic = **6 marks**; extended subtopic = **10 marks**; the three full-cycle content descriptions (VC2M9A06, VC2M9M05, VC2M9ST05) carry **4 test marks** for a short interpret-the-model or interpret-the-finding item and are assessed principally by a 20-mark rubric task, because a timed written test cannot assess *formulate*, *evaluate* and *report*.

Topic tests — 7 tests, 178 marks

One test per chapter, at the back of its chapter booklet. Each is cumulative over the chapters before it.

Test	Chapter	Subtopics scored	Part A (tech-free)	Part B (tech-active)	Total	Time
T1	1 — Real numbers, exponents, expressions	1A(6) 1B(6) 1C(10)	14	8	22	27 min
T2	2 — Linear	2A(10)	10	6	16	21 min

Test	Chapter	Subtopics scored	Part A (tech-free)	Part B (tech-active)	Total	Time
	relationships	2B(6)				
T3	3 — Quadratics, parameters, modelling	3A(10) 3B(6) 3C(4)	8	12	20	25 min
T4	4 — Space	4A(6) 4B(6) 4C(10)	10	12	22	27 min
T5	5 — Measurement	5A(10) 5B(6) 5C(10) 5D(6) 5E(4)	14	22	36	41 min
T6	6 — Statistics	6A(10) 6B(6) 6C(6) 6D(10) 6E(4)	10	26	36	41 min
T7	7 — Probability	7A(10) 7B(10) 7C(6)	10	16	26	31 min
		24 of 24 CDs scored	76	102	178	

Standing rules for every test:

- **Timing** is 1 minute per mark plus 5 minutes reading. The stated times are for planning a lesson, not a limit to beat.
- **Item mix** is short-answer dominant in the 1-, 2- and 3-mark band, with one 5–8 mark multi-part question per test set in a real Victorian context and carrying its source line. **Multiple choice sparingly — no more than 4 items in any one test, four options A–D, never five**, and only where the judgement is genuinely a selection task (which display is appropriate, 6B; which representation, 7A).
- **Reasoning is marked separately from the answer** in T4, T5 and T6 — VC2M9SP02 (“identify and explain”), VC2M9M03, VC2M9ST04 (“justify selections”) and VC2M9ST02 all require explanation, so an item in those subtopics carries at least 1 mark for the stated reason. A correct number with no reason does not score full marks.
- **T1 Part A includes calculator-free items on VC2M9N01**, since the content description requires problems solved with and without digital tools.
- **Equipment stated on each paper:** ruler, protractor and pair of compasses for T4 and T5; graphing tool or spreadsheet for T3 Part B; dynamic geometry software for T4 Part B; simulation access for T7 Part B. The equipment line is part of the instrument, not a footnote.
- Every test is followed by **answers** (final values only) and then **fully-worked solutions** for every item, each with its diagram.

Extended tasks — 3 tasks, 60 rubric marks

Three content descriptions require a full cycle a timed test cannot assess. Each task is a structured brief with a marking rubric, teacher-marked, run over about two to three lessons, and **not counted in the test totals above**. Do not delete them as “not a test” and do not fold them into the topic tests.

Task	Type	Host	Assesses	Marks
X1	Statistical investigation	6E	VC2M9ST05 cycle, drawing on	20



Task	Type	Host	Assesses	Marks
			6A–6D	
X2	Modelling with direct proportion, rates, ratio and scale	5E	VC2M9M05 cycle, drawing on 4B, 5C	20
X3	Modelling change: a linear or quadratic model, including simple interest	3C	VC2M9A06 cycle, drawing on 2A, 3A	20

Each rubric scores five criteria at 4 marks each: **formulate** (assumptions and variables stated) · **solve** (mathematics correct and shown) · **interpret** (answer read back into the situation, with units) · **evaluate** (model or method tested, limitations named) · **report** (methods and findings communicated to the stated audience). **The evaluate criterion is where X2 and X3 are actually won** — all three content descriptions require the model to be evaluated and the methods reported, and a task that stops at the answer has not delivered its content description. Tasks require student-generated or student-sourced data; the book supplies the brief, the planning frames, the data-quality checklist, the rubric, and one fully-worked exemplar on a supplied data set, labelled **EXEMPLAR – practice, not the task**. X1’s rubric requires sources, sampling method and its limitations to be named (VC2M9ST05, VC2M9ST02).

End-of-book review — 1 review, 70 marks

Review	Coverage	Part A (tech-free)	Part B (tech-active)	Total	Time
Level 9 Review	All 24 CDs, all six strands, sectioned by strand	28	42	70	Part A 30 min · Part B 45 min, sat separately

The review is the Year 9 exit check and the readiness check for Level 10. It is sectioned by strand so a teacher can mark diagnostically against the Level 9 achievement standard, using the corrected anchors in the coverage table above rather than the raw authority-file field. Its Chapter 1, 2 and 5 sections are the ones a Year 10 teacher should read first. Answers and fully-worked solutions throughout.

Totals

	Instruments	Marks
Topic tests (T1–T7)	7	178
End-of-book review	1	70
Extended tasks (rubric, not counted with tests)	3	60
Book	11	308

Mark schemes. Every test, the review and every rubric ship with criteria written in the language of the achievement-standard sentence each content description answers to, **as corrected in the coverage table above**, so a teacher’s judgement maps to VCAA wording without translation. **The rubrics for 3C and 5E use the un-swapped sentences, and those for 5C and 4A include the restored sentence 11** — a rubric built from the raw authority field would report the wrong outcome for four of the 24 content descriptions and would not report the trigonometry outcome at all.

What is not assessed. No Level 8 outcome as a Level 9 outcome and no Level 10 outcome at all; none of the twelve out-of-level items listed in “How to use this book” — in particular **no boxplot, quartile or interquartile range item; no quadratic formula or completing-the-square item; no simultaneous-equation item; no elevation, depression or bearing item; no conditional-probability item; and no three-stage-tree item**. An item testing any of these is a defect regardless of how well it is written.

The question bank. The bank holds 1,000 multiple-choice items keyed to the 24 codes in the coverage table. They are a linked digital asset: they are counted in the coverage table so the join can be seen to be live, but they are not reprinted in this book and they do not set page counts. Printed assessment uses multiple choice sparingly and on its own terms.

Administration

- **The marks are evidence, not ranking.** Records feed reporting against the Level 9 achievement standard for a school's own reporting; they are not a VCAA instrument and are not used to rank students.
 - **Completion is untimed in principle.** The guidance durations are for planning, not a limit; a student who needs a second sitting to finish a paper gets one. The review's two parts are sat separately by design.
 - **Equipment stated on the paper is permitted.** T4 and T5 without ruler, protractor and compasses have not assessed 4C and 5C; T7 Part B without simulation access has not assessed 7C.
 - **The digital-tool status is the curriculum's, not the teacher's preference.** 3B and 7C are compulsory; 1A runs both paths; a subtopic marked compulsory that is substituted with a hand-drawn illustration has not delivered its content description.
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Safety notes

This is a written maths workbook, and its risks are the ordinary ones of classroom materials, measuring instruments and classroom movement. Every subtopic and every test names its materials at the point of use; the standing rules below apply across the whole book.

1. **Compasses are sharp.** The constructions in subtopic 4C and the construction items in tests T4 and T5 use a pair of compasses with an exposed point. They are carried and passed point-down, stored closed when not in use, and collected at the end of the construction. A bent or loose compass is swapped, not forced.
2. **Rulers and protractors are measuring tools, not toys.** They lie flat on the page when measuring and constructing, they are passed and carried by hand, and a chipped or cracked protractor or a splintered ruler is swapped, not used. In 4C the ruler draws straight lines only — it is never used to measure lengths into place.
3. **Laboratory measuring follows the laboratory's own rules.** The instrument-reading work in subtopic 5B is set in a school science laboratory — measuring cylinders and pipettes with water. Water stays in small amounts, spills are wiped up at once (a wet floor is a slip hazard), glassware is carried with two hands and checked for chips before use, and water used for measuring is never drunk. Record each reading to the accuracy the instrument supports — that is the mathematics, and it is also the safe habit.
4. **Chance-experiment equipment stays with its task.** The coins, dice, spinners, counters and bags in Chapter 7 are mathematical equipment for conducting and recording trials, not games; the teacher collects and counts them back when the trials are done. Counters are not mouthed, and a die that rolls off the desk is retrieved, not chased.
5. **Data collection stays on school grounds.** The primary collections in subtopic 6E and extended task X1 — surveys, timing, direct measurement — run on school grounds in sight of the teacher, with the movement kept to a clear space where students are measuring travel times or distances. Nothing is measured on a road, and no survey approaches people outside the school community without the teacher's arrangement and the school's usual permissions.
6. **Screens and tools follow the school's own digital policies.** The compulsory digital work in 3B and 7C, and the optional tool work in 1A, 3A and 4B, uses whatever tool the teacher nominates; the book names the tool class and the expected input and output, and the school's normal rules for devices, accounts and data apply.

Cultural safety. Aboriginal and Torres Strait Islander content is handled as stated in the coverage map above: the eight elaborations that carry it are held back under the estate's content policy, the notice on the first page of every booklet in this series states the decision, and each affected subtopic records the exclusion in its own header. Where VCAA names no People, place or language group, this book names none either, and nothing is invented to stand in.