

Mathematics Level 7

Contents

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Contents

This book is the **Mathematics Level 7** student workbook. It is written for **Level 7** of the Victorian Curriculum F–10 Version 2.0 (VC2), Mathematics — Year 7 in Victorian schools, the first year of secondary. **One year level, not a band.** Every content description in this book is a Level 7 content description; nothing here is Level 6 revision and nothing here is Level 8 ahead-of-time. The series is ten booklets:

- **Chapter 1 — Whole numbers: integers, powers and square numbers (Number)** — Maths7_Chapter01 — subtopics 1A–1C, and the Chapter 1 test (35 pp)
- **Chapter 2 — Rational number, percentage and ratio (Number)** — Maths7_Chapter02 — subtopics 2A–2G, and the Chapter 2 test (86 pp)
- **Chapter 3 — Algebra: expressions, formulas, equations and relationships** — Maths7_Chapter03 — subtopics 3A–3F, and the Chapter 3 test (82 pp)
- **Chapter 4 — Measurement: area, volume, circles, angles and ratio** — Maths7_Chapter04 — subtopics 4A–4F, and the Chapter 4 test (78 pp)
- **Chapter 5 — Space** — Maths7_Chapter05 — subtopics 5A–5D, and the Chapter 5 test (58 pp)
- **Chapter 6 — Statistics** — Maths7_Chapter06 — subtopics 6A–6C, and the Chapter 6 test (42 pp)
- **Chapter 7 — Probability** — Maths7_Chapter07 — subtopics 7A and 7B, and the Chapter 7 test (25 pp)
- **Chapter 8 — Investigation and modelling tasks** — Maths7_Chapter08_Tasks — tasks I1 and I2 with marking rubrics, for the verbs a timed written test cannot assess: *plan and conduct, formulate, interpret and communicate* (22 pp)
- **Chapter 9 — End-of-year review** — Maths7_Chapter09_Review — the cumulative review drawn from all six strands, with fully-worked solutions (22 pp)
- **Chapter 0 — Contents** — Maths7_Chapter00_Contents — this booklet: how to use the book, what it covers, teacher notes, safety notes and the word list (00 pp)

Series total: ten booklets ≈ 450 pages. The built booklets — Maths7_Chapter00_Contents, Maths7_Chapter01 to Maths7_Chapter07, Maths7_Chapter08_Tasks and Maths7_Chapter09_Review — are in S:\Files\VC2Maths\Textbook7\.

How to use this book

The chapters follow the strands. Chapters run Number → Algebra → Measurement → Space → Statistics → Probability, one chapter per strand except Number. Number carries 10 of the 31 content descriptions — ten content descriptions in one chapter would produce an unteachable booklet — so it is split across two chapters: whole-number structure first (integers, powers and square numbers), then rational number, percentage and ratio. Both chapters stay wholly inside the Number strand, and no chapter mixes strands: this is a sizing split, not a departure from the strand order.

Chapter order is VCAA’s strand order, not a teaching sequence. A school may reorder the chapters to suit its own scope and sequence; the subtopics are written to survive that reordering, with cross-references stated where a genuine dependency exists — 1B before 1C, 2F before 4F, the angle facts of 4D and 4E used again in 5B, and the Cartesian plane of 3D used again in 5D.

One content description per subtopic. Each of the 31 subtopics owns exactly one VC2 content description, quoted by its code at the top of the subtopic, and its teaching sequence is built to deliver that content description. Thirty-one subtopics is roughly one a week across the year, with room for the investigations. VCAA’s elaborations — the examples it suggests for what a content description might look like — are carried in each subtopic’s code line for linkage and coverage, not as a checklist to work through.

The shape of every subtopic. Each subtopic opens with its VC2 code, the content description and the achievement-standard extract, quoted verbatim from the curriculum authority file. Then come the theory, the worked examples — first scaffolded, then unscaffolded — the practice questions, scaffolded and then unscaffolded, and answers with fully-

worked solutions, so a student can check their own working. A teacher note closes every subtopic: the scope decisions kept, the Level 6 recalls maintained, and the boundaries not crossed.

Level 6 is assumed, and Level 8 is reserved. The Level 6 results this book builds on — integers on a number line, fraction equivalence and fraction arithmetic, decimal place value and rounding, a fraction, decimal or percentage of a quantity, metric unit conversion, the area of a rectangle, angles on a straight line and at a point, the four quadrants, combinations of transformations, comparative data displays and probabilities on the 0–1 scale — are recalled where they are needed and maintained, not re-taught. Metric unit conversion is the load-bearing case: there is no Level 7 content description for it, yet 4A, 4B and 4F cannot be done without it, so it is maintained inside those subtopics and flagged in their teacher notes. Everything past the Level 7 line stays out: multiplying and dividing integers, percentage increase and decrease, rates, circle area, the exponent laws, Pythagoras’ theorem, congruence and similarity, recurring decimals, factorising and expanding all belong to Level 8, and none of them appears here.

The book is written for a Year 7 reader. The general vocabulary is held at or below Year 7 reading level, so the difficulty lands on the mathematics, not on the reading. Every new mathematics word is defined where it first appears, and the curriculum’s own words are always taught, never avoided. The word list at the back gathers the vocabulary sets the plan names.

The notation in this book. Negatives and subtraction use a proper minus sign: -4 , $6 - 9$. In this book the glyph is content, not typography — integers, negative rationals and negative coordinates are taught, not just typeset. Multiplication is $\times$, division is $\div$ in arithmetic; algebra uses implied multiplication ($3x$, not $3 \times x$) and the fraction bar for division. Numbers above 9999 use a space as the group separator: 10 000, never 10,000. Metric units sit after a space (12 cm, 3.5 kg, 250 mL), with true superscripts for cm^2 , cm^3 and m^3 . Dates are in Australian order: 7 August 2026. This book says **exponent**, not index — VCAA’s word — and **natural numbers**, not counting numbers; **dice** is singular, **stem-and-leaf plot** is hyphenated, and recurring decimals carry no overbar notation, which is Level 8.

Everything real is really real. Every table, graph, statistic, price and record in the book is real, named and carries a source line with a retrieval date — the Australian Bureau of Statistics, the Bureau of Meteorology, the Australian Securities Exchange and published Victorian energy usage data among them. Money is in Australian dollars at a stated date. Where a context is genuinely fictional — a school canteen, a class fundraiser — it is transparently fictional, and no invented community, organisation, statute or place is ever presented as real. Seasons, weather and place names are correct for Victoria: a Melbourne temperature series peaks in January, not July.

Digital tools where the curriculum names them. There is no CAS anywhere in this book. A scientific calculator, spreadsheets, dynamic geometry software, graphing software and simulation tools appear only where a content description names digital tools. They are **compulsory** in 3F and 7B, whose content descriptions say “using digital tools” without qualification — a hand-drawn illustration or twenty hand-rolled dice throws is not delivery. 2E is done both with and without digital tools, because its content description requires both. In 2C, 2G and 6B the tool supports the strategy and does not replace it. Software is referred to generically, with no product names or menu paths, so the book does not rot with a release.

Which book is which. This is the single-level Year 7 book. Its neighbours are the Level 6 book behind it and the Level 8 book ahead of it; nothing from either is taught here. The Levels 7–8 band book carries the same 31 Level 7 codes for composite Year 7/8 classes; it is a different packaging of the same curriculum, written independently of this one — a straight Year 7 class uses this book, and a composite 7/8 class uses the band one.

What this book covers

The table below is the coverage register for this book: all 31 content descriptions of VC2 Mathematics Level 7, each against the subtopic that owns it, with its elaboration ids and the number of banked multiple-choice questions already keyed to it. Every code appears exactly once as an owner. There are no unowned codes, and no code is deferred to another book — the Level 6 codes live in the Level 6 book and the Level 8 codes in the Level 8 book, and nothing is handed off in either direction. The series checks itself against this map.

#	Code	Strand	Owner	Elaboration ids	MCQs
1	VC2M7N01	Number	1C	.E01 .E02 . E03 .E04 .E	24



#	Code	Strand	Owner	Elaboration ids	MCQs
2	VC2M7N02	Number	1B	05 .E01 .E02 . E03 .E04 .E 05	27
3	VC2M7N03	Number	2A	.E01 .E02 . E03 .E04	15
4	VC2M7N04	Number	2B	.E01 .E02 . E03	12
5	VC2M7N05	Number	2C	.E01	9
6	VC2M7N06	Number	2D	.E01 .E02 . E03 .E04 .E 05 .E06	27
7	VC2M7N07	Number	2E	.E01	6
8	VC2M7N08	Number	1A	.E01 .E02 . E03	21
9	VC2M7N09	Number	2F	.E01 .E02 . E03 .E04	12
10	VC2M7N10	Number	2G	.E01 .E02 . E03 .E04 .E 05 .E06	18
11	VC2M7A01	Algebra	3A	.E01 .E02 . E03 .E04	142
12	VC2M7A02	Algebra	3B	.E01 .E02 . E03 .E04 .E 05	198
13	VC2M7A03	Algebra	3C	.E01 .E02 . E03	99
14	VC2M7A04	Algebra	3E	.E01 .E02 . E03 .E04	158
15	VC2M7A05	Algebra	3D	.E01 .E02 . E03 .E04	21
16	VC2M7A06	Algebra	3F	.E01 .E02 . E03	15
17	VC2M7M01	Measurement	4A	.E01 .E02 . E03	18
18	VC2M7M02	Measurement	4B	.E01 .E02 . E03 .E04	15
19	VC2M7M03	Measurement	4C	.E01 .E02 . E03 .E04	18
20	VC2M7M04	Measurement	4D	.E01 .E02 . E03 .E04	18
21	VC2M7M05	Measurement	4E	.E01 .E02	12
22	VC2M7M06	Measurement	4F	.E01 .E02 . E03 .E04	12
23	VC2M7SP01	Space	5A	.E01 .E02 . E03 .E04 .E 05 .E06	18
24	VC2M7SP02	Space	5B	.E01 .E02 . E03 .E04	12

#	Code	Strand	Owner	Elaboration ids	MCQs
25	VC2M7SP03	Space	5D	.E01 .E02 . E03	12
26	VC2M7SP04	Space	5C	.E01 .E02 . E03	12
27	VC2M7ST01	Statistics	6A	.E01 .E02 . E03 .E04	15
28	VC2M7ST02	Statistics	6B	.E01 .E02 . E03 .E04 .E 05	15
29	VC2M7ST03	Statistics	6C	.E01 .E02 . E03 .E04 .E 05	15
30	VC2M7P01	Probability	7A	.E01 .E02 . E03	9
31	VC2M7P02	Probability	7B	.E01 .E02 . E03	9
				118 elaborations	1,014

Notes on this table:

- The **Elaboration ids** column shows the suffixes; the full id is the code plus the suffix — row 1 is VC2M7N01.E01 ... VC2M7N01.E05. The suffix is positional in VCAA's own order within its content description and is never renumbered.
- **Elaborations are illustrations, not a syllabus.** The content description is the expectation; an elaboration is one way VCAA suggests it might look. The coverage check asks whether each content description was taught — an elaboration that is not used is not a gap.
- **Nine elaborations are reserved and are not taught in this book.** They are the ones that invoke Aboriginal and Torres Strait Islander knowledges, practices, places or games: VC2M7N10.E06, VC2M7M06.E04, VC2M7A01.E04, VC2M7A02.E05, VC2M7A04.E04, VC2M7M03.E04, VC2M7SP01.E06, VC2M7ST03.E05 and VC2M7P02.E03. They are reserved under the notice on the first page of every booklet in this series: Aboriginal and Torres Strait Islander content is excluded as accuracy cannot be guaranteed, and it is better to be respectful than cover the entire curriculum inaccurately. Each of the nine is recorded in its subtopic's teacher note as an accepted exclusion rather than a gap. Because elaborations are illustrations, no content description is left without a teaching sequence — every code is still delivered in full by its subtopic, and each of the nine keeps its other elaborations.
- **The counts close.** 31 codes, 31 owners — every code is owned exactly once. 118 elaboration ids, each carried exactly once. 1,014 banked questions keyed to these codes. Verified programmatically against the authority file on 7 August 2026: 31 records, 31 distinct codes, no duplicates; the elaboration ids sum to 118; and the MCQ column sums to 1,014, matching the authority file.
- **The bank's shape does not set teaching weight.** The bank is wildly uneven: VC2M7A02 carries 198 questions and VC2M7A04 158, while VC2M7N07 carries 6, and VC2M7P01 and VC2M7P02 carry 9 each. That is a fact about the bank's history, not about the curriculum. Every content description is taught to the same depth and is worth the same 5 test marks; where the bank is thin — 2C, 2E, 7A and 7B — the shortfall is made up with originally authored items, and where it is thick, as in Chapter 3, every drawn item is checked against the Level 8 reserved list before it is used.
- **Codes that do not exist.** Level 7 Number ends at N10, Algebra at A06, Measurement at M06, Space at SP04, Statistics at ST03 and Probability at P02. There is no VC2M7N11, no VC2M7A07, no VC2M7M07, no VC2M7SP05, no VC2M7ST04, no VC2M7P03 — the numbering stops because the curriculum stops, not because anything is missing.

What this book does not cover. This book covers Level 7 only. What Level 6 taught is assumed, not re-taught: integers on a number line and as coordinates; prime, composite, square and triangular numbers; fraction equivalence, ordering, and addition and subtraction of fractions; decimal place value, multiplying and dividing decimals by powers of 10, and rounding; a fraction, decimal or percentage of a quantity, including discounts; conversion between common metric units; the area of a rectangle formula; elapsed time, timetables and itineraries; angles on a straight line, angles at a point and vertically opposite angles; cross-sections and their relationship to right prisms; the four quadrants of the Cartesian plane; combinations of transformations and tessellations; comparative data displays and planning an investigation; and probabilities on the 0–1 and 0%–100% scales. Everything past the Level 7 line stays out: multiplying and dividing integers, rational solutions to equations and inequalities, percentage increase, decrease and error, rates and constant-speed modelling, gradient and equations of a line, circle area, classifying irrational numbers, the exponent laws, terminating and recurring decimals, factorising and expanding, Pythagoras’ theorem, congruence and similarity, capacity and the mL/cm³ equivalence, populations and sampling, two-event probability, three-dimensional coordinates and time content are all Level 8 or beyond, and none of it is taught here. VCE content is nowhere in this book.

Teacher notes

Assessment in this book is pitched for the first year of secondary: longer and more formal than the Level 6 book, with working shown and reasoning marked, but well short of a Year 10 paper — no multi-part extended investigations inside a timed test, no item that requires more than two linked steps, and reading load kept low. Every content description is worth the same: **5 marks per subtopic**, so every content description carries equal weight and a coverage audit can read delivery off the mark schedule.

The chapter tests — 7 tests, 155 marks total.

Test	Chapter	Subtopics	Marks	Time
T1	1 — Whole numbers: integers, powers and square numbers	3	15	20 min
T2	2 — Rational number, percentage and ratio	7	35	40 min
T3	3 — Algebra: expressions, formulas, equations and relationships	6	30	35 min
T4	4 — Measurement: area, volume, circles, angles and ratio	6	30	35 min
T5	5 — Space	4	20	25 min
T6	6 — Statistics	3	15	20 min
T7	7 — Probability	2	10	15 min
	Totals	31	155	

Administration — the standing rules. These apply to every chapter test:

- **Timing is 1 minute per mark plus 5 minutes reading.** T2 is the longest paper in the book and may be split across two sittings — 2A–2D first, then 2E–2G; nothing else needs splitting. T7 is short by design, because VCAA gives Level 7 two probability content descriptions; it is not to be padded out.

- **Structure is short-answer and extended-response.** Multiple choice appears only where the judgement is genuinely a selection task — which measure of centre is informative (6A), which display suits the data (6B), which representation of a solid is most useful (5A) — and then with four options A–D, never five.
- **Reasoning is marked separately from the answer in T4 and T5.** The parallel-line and polygon content requires reasons, and classifying polygons and judging representations requires reasoning about relationships and usefulness. A 5-mark item from 4D, 4E, 5A or 5B carries at least 1 mark for the stated reason; a correct number with no reason does not score full marks. The house form for a reason is statement · reason · conclusion.
- **Verification is marked in T3.** Solving one-variable linear equations requires verification by substitution, so 3C's items award a mark for the check, and an unverified correct answer does not score full marks. Solutions are natural numbers only — that is the level's own boundary.
- **Calculator-free items are marked as such on the paper.** T2 carries calculator-free items from 2E, whose content description requires the work both with and without digital tools. Every other paper states plainly whether a scientific calculator, spreadsheet, dynamic geometry software or simulation tool is permitted or required. There is no CAS anywhere in this book's assessment.
- **Equipment is stated on each paper.** Ruler, protractor and pair of compasses for T4 and T5; spreadsheet or graphing software for the 3F items in T3; simulation access for T7.
- **Every test carries fully-worked solutions,** not just an answer key, plus a compact answer key for self-checking.
- **No test item draws on Level 8 content.** Where a bank-drawn item drifts forward, it is rewritten or dropped.

The investigation and modelling tasks — 2 tasks, 40 marks total. The verbs *plan and conduct* and *formulate, interpret* and *communicate* cannot be assessed in a timed test. Each task runs over about two lessons plus homework and carries a marking rubric.

Task	Draws on	Marks
I1 — Plan and conduct a statistical investigation on a question of the student's own framing	6C, supported by 6A and 6B	20
I2 — An applied modelling task: a best-buy or proportion decision, and a ratio mixture, in a real context	2G and 4F, supported by 2E and 2F	20

Rubric criteria, 5 marks each: **formulating** the problem or question; **choosing** a representation and a calculation strategy, with the choice justified; **executing** the mathematics accurately; and **interpreting and communicating** the solution in terms of the situation. The fourth criterion is where the marks are actually won, and where a Level 7 cohort most often loses them, so its rubric descriptors are written in full and shown to students before the task. Every modelling item runs the full cycle the content description specifies — formulate the problem, choose a representation and a calculation strategy, solve, then interpret and communicate the solution in terms of the situation, justifying the choice of representation; an item that stops at the answer has not delivered the content description. I1 requires its data source to be named and dated. The Level 8 step of reviewing the appropriateness of the model is not assessed here; it belongs to Level 8, not to this book.

The end-of-year review — R7 — 60 marks, 70 minutes. Run once, after the chapters. R7 covers all 31 content descriptions across all six strands and is sectioned by strand, so a teacher can mark diagnostically against the Level 7 achievement standard, with the section marks weighted to each strand's content-description count: Number 20, Algebra 12, Measurement 12, Space 7, Statistics 6, Probability 3. It is split into Part 1, no digital tools, 20 marks, and Part 2, digital tools permitted where the content description allows them, 40 marks — one content description requires the work both with and without digital tools and two make a tool compulsory, and that is the whole reason for the split. Fully-worked solutions and a compact answer key ship with the paper. R7 is the Year 7 exit check and the readiness check for Level 8: the Number and Algebra sections are the ones a Year 8 teacher should read first, because Level 8 opens by completing the operations on integers and rationals and by expanding and factorising the expressions this book only forms.

Total assessed marks: 155 (chapter tests) + 40 (investigation and modelling tasks) + 60 (end-of-year review) = 255.

The question bank. The bank holds 1,014 multiple-choice items keyed to the 31 codes in the coverage map, wildly uneven across them. The items are a practice resource for the subtopic exercise sets — they are not the assessment in this book, and the bank’s shape changes authoring effort, never teaching weight or test marks.

Safety notes

The practical work in this book is limited and low-risk — geometry constructions, measuring around circles, folding and cutting nets, chance experiments, and collecting class data — and every activity names its materials at the point of use. Standing rules, in every part of the book:

1. **No flame, no heating, no chemicals, no blades.** The only cutting in the book is scissors for paper and card — the nets in 5A and the cardboard spinners in 7B — used under supervision.
 2. **Compasses have sharp points.** The circle drawing in 4C, the constructions in 4D, and the compasses in the T4 and T5 equipment are passed point-down, used at the desk, and returned to their case at the end of the lesson.
 3. **String stays on the desk.** The circumference investigation in 4C uses short lengths of string, wrapped once around a drawn circle and then straightened along a ruler. String is cut with scissors, not snapped, and is not worn or swung.
 4. **Chance equipment stays with its task.** The dice, cardboard spinners and paper-clip pointers in Chapter 7 are equipment for recording results, not games; the paper-clip points are handled carefully, and the teacher collects everything when the trials are done.
 5. **Data collection stays calm.** The class data work in 6A and 6C — reaction times, paper-glider flights, measurements around the room — clears floor space first, and students walk, not run. Anything done outside the classroom stays on school grounds, with the class in sight of the teacher.
 6. **Survey data stays anonymous.** Class surveys record values only — never names — and no student is asked for personal or sensitive information. Task I1 names and dates its data source; secondary data from the Australian Bureau of Statistics or the Bureau of Meteorology needs no consent, and is cited.
 7. **Food is checked first.** Where a teacher chooses to enact a ratio context with real materials — the salad-dressing and colour-mixing contexts in 4F, the best-buy packaging in 2G — allergies are checked before anything is handed out, and nothing prepared in class is eaten without the school’s usual food permissions.
 8. **Screens follow the school’s rules.** The calculator, spreadsheet, dynamic geometry, graphing and simulation work in 2C, 2E, 2G, 3F, 5D, 6B and 7B runs on school-approved devices and accounts, under the school’s own digital arrangements.
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Word list

Every new mathematics word in this book is defined where it first appears, and most subtopics carry their own word table. The plan names four vocabulary sets as owned and examinable; they are gathered here, chapter by chapter, the way the book teaches them.

Chapter 1 words

1A — Comparing, ordering, adding and subtracting integers

- **addition** — combining two numbers into one
- **subtraction** — taking one number away from another
- **magnitude** — the distance of an integer from zero; never negative
- **difference** — the result of a subtraction; the gap between two values
- **sign** — whether an integer is positive or negative

Chapter 5 words

5B — *Classifying triangles, quadrilaterals and other polygons*

- **parallelogram** — a quadrilateral with two pairs of parallel sides
- **rectangle** — a quadrilateral with four right angles
- **rhombus** — a quadrilateral with four equal sides
- **square** — a quadrilateral with four equal sides and four right angles
- **kite** — a quadrilateral with two pairs of equal sides next to each other
- **trapezium** — in this book: a quadrilateral with exactly one pair of parallel sides

The relationships between these shapes are explained in 5B, not just the names: a square is a rectangle and a rhombus at once, and the classification is worth as much as the vocabulary.

Chapter 6 words

6A — *Acquiring data; range, median, mean and mode*

- **discrete** — of a numerical variable: counted, whole-number values
- **continuous** — of a numerical variable: measured, any value within a range
- **range** — largest value – smallest value
- **median** — the middle value once the data is ordered; with an even number of values, the mean of the middle two
- **mean** — the sum of the values $\div$ the number of values
- **mode** — the value that appears most often
- **outlier** — a value a long way from the rest of the data

6B — *Dot plots and stem-and-leaf plots: shape, centre and spread*

- **symmetric** — of a distribution: the two halves look like mirror images
- **positive skew** — of a distribution: a tail stretching to the high side
- **negative skew** — of a distribution: a tail stretching to the low side
- **bi-modal** — of a distribution: two separate peaks

The shape words are examinable: 6A requires a justified decision about which measure of centre is informative, and 6B connects these shape words to the summary statistics.

Chapter 7 words

7A — *Sample spaces and probabilities for single-stage experiments*

- **experiment** — a chance set-up, like throwing a dice
- **trial** — one go of the experiment
- **event** — an outcome, or group of outcomes, we care about
- **favourable outcome** — an outcome that makes the event happen
- **sample space** — the list of all possible outcomes
- **probability** — a number from 0 to 1 saying how likely an event is

Every other subtopic defines its own words at first use, in its own word table or in the text itself. The terms of art this book keeps, wherever they appear, follow VCAA's usage rather than textbook habit: **exponent**, not index; **natural numbers**, not counting numbers; **co-interior**, not allied; **stem-and-leaf plot**, with hyphens; and **dice** for the singular.