Captivate
EDUCATION

Given name/s	
Family name	
Teacher	

Trial 1 external assessment 2027

Question and response book

General Mathematics

Paper 1

SAMPLE

Time allowed

- Perusal time — 5 minutes
- Working time — 90 minutes

General instructions

- Answer all questions in this question and response book.
- QCAA-approved scientific calculator permitted.
- QCAA formula book provided.
- Planning paper will not be marked.

Section 1 (15 marks)

- 15 multiple choice questions

Section 2 (42 marks)

- 10 short response questions

Practice material in the layout of the 2025 QCAA external assessment. Not a QCAA assessment.

Sample pages only. Full paper and marking guide: captivateeducation.com.au/trial-exams/qce/general-mathematics

Section 1

Instructions

- This section has 15 questions and is worth 15 marks.
- Use a 2B pencil to fill in the A, B, C or D answer bubble completely.
- Choose the best answer for Questions 1–15.
- If you change your mind or make a mistake, use an eraser to remove your response and fill in the new answer bubble completely.

	A	B	C	D
Example:	●	○	○	○

	A	B	C	D
1.	○	○	○	○
2.	○	○	○	○
3.	○	○	○	○
4.	○	○	○	○
5.	○	○	○	○
6.	○	○	○	○
7.	○	○	○	○
8.	○	○	○	○
9.	○	○	○	○
10.	○	○	○	○
11.	○	○	○	○
12.	○	○	○	○
13.	○	○	○	○
14.	○	○	○	○
15.	○	○	○	○

Ensure you have filled an answer bubble for each question.

SAMPLE

Do not write outside this box.

Section 2

Instructions

- Write using black or blue pen.
- Questions worth more than one mark require mathematical reasoning and/or working to be shown to support answers.
- If you need more space for a response, use the additional pages at the back of this book.
  - On the additional pages, write the question number you are responding to.
  - Cancel any incorrect response by ruling a single diagonal line through your work.
  - Write the page number of your alternative/additional response, i.e. See page …
  - If you do not do this, your original response will be marked.
- This section has 10 questions and is worth 42 marks.

DO NOT WRITE ON THIS PAGE
THIS PAGE WILL NOT BE MARKED

SAMPLE

Do not write outside this box.

QUESTION 16 (3 marks)

Two weather stations lie on the same meridian. Station P is at (24.6° N 138° E) and Station Q is at (11.3° S 138° E).

Calculate the distance between the two stations, rounded to the nearest kilometre.

SAMPLE

Do not write outside this box.

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General Mathematics marking guide and response

Trial 1 external assessment 2027 · Paper 1 · 57 marks

Teacher copy – not for distribution to students.

Where a response does not meet any of the descriptors for a question or a criterion, a mark of '0' will be recorded.

SAMPLE

Marking guide

Multiple choice

Question	Response	Explanation
1	**D**	**Correct:** Euler's formula (formula book) gives $v + f - e = 2$, so $7 + f - 11 = 2$ and $f = 6$. **Common errors** • A reads the constant on the right of Euler's formula as the answer. • B computes $e - v$ and omits the + 2. • C makes an off-by-one error, computing $e - v + 1$.
2	**B**	**Correct:** Diminishing-value depreciation is geometric decay with common ratio $r = 1 - 0.18 = 0.82$, so the value after n years is $42\,000 \times 0.82^n$. After 4 years, $42\,000 \times 0.82^4 = 42\,000 \times 0.452122 = \$18\,989.11$. **Common errors** • A applies straight-line depreciation: $42\,000 - 4 \times 0.18 \times 42\,000$. • C uses $n = 3$ instead of 4, miscounting the depreciation periods. • D gives the total amount of depreciation under a straight-line model rather than the remaining value.

3	**B**	**Correct:** A five-point moving average for April is the mean of April and the two values either side of it: (41 + 38 + 47 + 52 + 44) ÷ 5 = 222 ÷ 5 = 44.4. **Common errors** • A centres the five values on March (Jan–May). • C calculates a three-point moving average instead of a five-point one. • D centres the five values on May (Mar–Jul).
4	**C**	**Correct:** The degree of a vertex is the number of edge-ends meeting at it, and a loop contributes 2. Vertex C is joined to A, to B and to D, and carries one loop, so degree(C) = 1 + 1 + 1 + 2 = 5. **Common errors** • A counts adjacent vertices only and ignores the loop entirely. • B counts the loop as contributing 1 rather than 2. • D gives the total number of edges in the graph rather than the degree of C.
5	**C**	**Correct:** Forward scanning gives two paths: A → C → E → F = 4 + 5 + 7 + 2 = 18 days, and B → D → E → F = 5 + 3 + 7 + 2 = 17 days. The critical path is A–C–E–F, so the minimum completion time is 18 days. **Common errors** • A omits activity F from the critical path. • B follows the non-critical path B–D–E–F, taking the shorter rather than the longer path. • D sums every duration, treating all activities as sequential.
6	**A**	**Correct:** A linear model is appropriate when the residual plot shows points scattered randomly above and below the horizontal zero line, with no pattern and roughly constant spread. **Common errors** • B shows a clear curved pattern — residuals systematically positive, then negative, then positive — indicating a non-linear association the linear model has not captured. • C shows a funnel: the spread of residuals increases as *x* increases, so the scatter is not consistent across the range. • D shows residuals increasing steadily with *x*, a systematic linear trend that the fitted line should already have absorbed. Students who choose D often confuse the residual plot with the scatterplot itself, reading a strong straight-line pattern as evidence of a good fit.

SAMPLE

7	**A**	**Correct:** During January, Auckland's daylight saving time is GMT +12 + 1 = GMT +13, and Perth is GMT +8. The time difference is (+13) − (+8) = 5 hours, with Perth behind, so the time in Perth is 9:00 pm Tuesday − 5 hours = 4:00 pm Tuesday. **Common errors** • B ignores daylight saving and uses a 4-hour difference. • C adds the 5-hour difference instead of subtracting it, reversing which location is ahead. • D adds Perth's GMT offset of 8 hours directly to the Auckland time.
8	**C**	**Correct:** The capacity of a cut is the sum of the capacities of the edges crossing it from the source side to the sink side. Cut 1 separates {S, A, B} from {T}, so the crossing edges are A → T and B → T, giving 7 + 10 = 17 kL/hour. For this network the minimum cut is also 17 kL/hour, so the maximum flow is 17 kL/hour. **Common errors** • A adds A → T and A → B, counting an edge that does not cross the cut and missing B → T. • B adds S → B and A → B, neither of which crosses the cut. • D finds the capacity of the cut adjacent to the source (S → A plus S → B) rather than the cut shown.
9	**A**	**Correct:** The question asks for a percentage *within* the '40 and over' column, so the column total is the denominator. Total aged 40 and over = 150 + 90 = 240, and 90 ÷ 240 × 100 = 37.5%. **Common errors** • B uses the public transport row total (216) as the denominator, answering 'what percentage of public transport users are aged 40 and over'. • C uses the row total but the wrong cell (126 ÷ 216), giving the under-40 public transport users. • D uses the correct denominator but the wrong cell (150 ÷ 240), giving those aged 40 and over who drive.
10	**B**	**Correct:** The towns lie on the same parallel of latitude, so the parallel formula applies (formula book). Angular distance = 124° − 116° = 8°, and D = 111.2 cos θ × angular distance = 111.2 × cos(32°) × 8 = 111.2 × 0.848048 × 8 = 754.4 km. Accept 754 km; responses of 753–755 km indicate correct method with rounding applied at a different stage. **Common errors** • A uses sin θ in place of cos θ. • C omits the cosine factor, using the same-meridian formula D = 111.2 × angular distance. • D divides by cos θ instead of multiplying by it.

SAMPLE