Captivate
EDUCATION

# General Mathematics

## Multiple-Choice Question Book

Practice examination 1 – Examination 1 – 2027

**Student name** _____

**Teacher** _____

- Reading time is 15 minutes
- Writing time is 1 hour 30 minutes

### Approved materials

- One bound reference that may be annotated
- One approved CAS calculator or CAS software, and one scientific calculator

### Materials supplied

- Multiple-Choice Question Book
- Formula Sheet
- Multiple-Choice Answer Sheet

### Instructions

- Follow the instructions on your Multiple-Choice Answer Sheet.
- You may keep this Multiple-Choice Question Book.

**Students are not permitted to bring mobile phones and/or any unauthorised electronic devices into the examination room.**

### Contents

40 questions (40 marks)

Practice material in the layout of the 2025 VCAA paper – generated 2027. Not a VCAA examination.

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### Instructions

- Answer **all** questions in pencil on your Multiple-Choice Answer Sheet.
- Choose the response that is correct for the question.
- A correct answer scores 1; an incorrect answer scores 0.
- Marks will not be deducted for incorrect answers.
- No marks will be given if more than one answer is completed for any question.
- Unless otherwise indicated, the diagrams in this book are not drawn to scale.

## Data analysis

**Use the following information to answer Questions 1 and 2.**

A health expo surveyed 240 adults. Each adult was classified by *age group* (18–34, 35–54, 55 and over) and by *weekly exercise level* (low, moderate, high). The results are shown in the two-way frequency table below.

| ***Weekly exercise level*** | ***Age group*** | | | **Total** |
|---|---|---|---|---|
| | **18–34** | **35–54** | **55 and over** | |
| **Low** | 18 | 30 | 36 | 84 |
| **Moderate** | 32 | 34 | 30 | 96 |
| **High** | 30 | 16 | 14 | 60 |
| **Total** | 80 | 80 | 80 | 240 |

**Question 1**

The variables *age group* and *weekly exercise level* are

**A.** both ordinal variables.

**B.** both nominal variables.

**C.** a nominal variable and an ordinal variable respectively.

**D.** an ordinal variable and a discrete numerical variable respectively.

**Question 2**

Of the adults aged 55 and over, the percentage who had a high weekly exercise level is

**A.** 5.8%

**B.** 17.5%

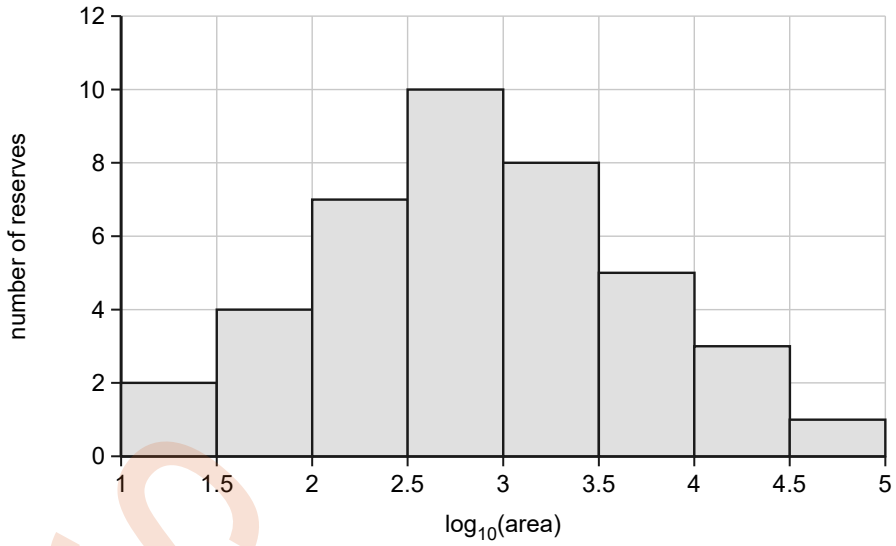
**C.** 23.3%

**D.** 45.0%

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**Use the following information to answer Questions 3 and 4.**

The areas, in hectares, of 40 nature reserves in a region were recorded. The histogram below displays the distribution of the areas on a $\log_{10}$ scale.




**Question 3**

The number of these nature reserves with an area greater than 10 000 hectares is

**A.** 1

**B.** 4

**C.** 9

**D.** 17

**Question 4**

The median area of these nature reserves, in hectares, lies between

**A.** 316 and 1000

**B.** 2.5 and 3.0

**C.** 100 and 316

**D.** 1000 and 3162

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**Use the following information to answer Questions 5 and 6.**

The stem plot below shows the number of minutes of moderate physical activity recorded on one day by 19 Year 11 students.

| Stem | Leaf |
|---|---|
| 1 | 2 8 |
| 2 | 5 8 |
| 3 | 1 3 5 6 8 |
| 4 | 0 2 4 5 7 9 |
| 5 | 2 5 |
| 6 | 1 |
| 7 | |
| 8 | 8 |

Key: 4|2 = 42 minutes

**Question 5**

The interquartile range (IQR) of these activity times, in minutes, is

**A.** 9

**B.** 16

**C.** 18

**D.** 76

**Question 6**

A boxplot is constructed to display these activity times, showing possible outliers. The upper whisker of the boxplot would end at

**A.** 49

**B.** 61

**C.** 76

**D.** 88

**Question 7**

The lengths of adult female platypuses in a river system are approximately normally distributed with a mean of 46 cm and a standard deviation of 3 cm.
The percentage of adult female platypuses with a length between 40 cm and 49 cm is

**A.** 47.5%

**B.** 68%

**C.** 81.5%

**D.** 95%

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# General Mathematics

## Marking scheme – teacher copy

Practice examination 1 – Examination 1 – 2027

**Not for distribution to students.**

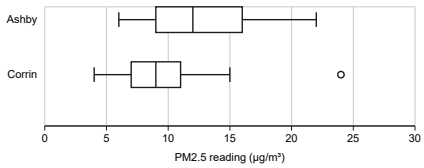
| Section | Questions | Marks available | Marks awarded |
|---|---|---|---|
| Paper | 40 | 40 | |
| **Total** | | **40** | |

| Question | Key | Question | Why |
|---|---|---|---|
| 1 | **A** | The variables *age group* and *weekly exercise level* are | Both variables are categorical with a natural order (age groups and low/moderate/high), so both are ordinal. B treats both as unordered; C treats *age group* as unordered; D treats an exercise category as a count. |
| 2 | **B** | Of the adults aged 55 and over, the percentage who had a high weekly exercise level is | 14 ÷ 80 = 17.5%. 5.8% divides by the overall total (240); 23.3% is the row percentage (14 ÷ 60); 45.0% is the low exercise level (36 ÷ 80). |
| 3 | **B** | The number of these nature reserves with an area greater than 10 000 hectares is | 10 000 = $10^4$, so count the columns from 4.0: 3 + 1 = 4. 1 counts only the 4.5–5.0 column; 9 starts from 3.5 (about 3162 ha); 17 starts from 3.0 (1000 ha). |
| 4 | **A** | The median area of these nature reserves, in hectares, lies between | The median is the mean of the 20th and 21st values; cumulative frequencies 2, 6, 13, 23 place both in the 2.5–3.0 class, i.e. between $10^{2.5}$ ≈ 316 ha and $10^3$ = 1000 ha. B gives log values, not areas; C is the class below and D the class above. |

SAMPLE

<table>
<tr><td>5</td><td>C</td><td>The interquartile range (IQR) of these activity times, in minutes, is</td><td>$Q_1$ = 31 and $Q_3$ = 49 (medians of the nine values below and above the median of 40), so IQR = 18. 16 includes the median in both halves; 9 is $Q_3$ − median; 76 is the range.</td></tr>
<tr><td>6</td><td>B</td><td>A boxplot is constructed to display these activity times, showing possible outliers. The upper whisker of the boxplot would end at</td><td>Upper fence = 49 + 1.5 × 18 = 76; 88 is a possible outlier, so the whisker ends at the largest value inside the fence, 61. 76 is the fence itself; 88 ignores the outlier; 49 is $Q_3$.</td></tr>
<tr><td>7</td><td>C</td><td>The lengths of adult female platypuses in a river system are approximately normally distributed with a mean of 46 cm and a standard deviation of 3 cm.<br>The percentage of adult female platypuses with a length between 40 cm and 49 cm is</td><td>40 cm is 2 standard deviations below the mean (47.5%) and 49 cm is 1 standard deviation above (34%): 47.5% + 34% = 81.5%. 47.5% counts only the lower part; 68% and 95% are the ±1 and ±2 standard deviation intervals.</td></tr>
<tr><td>8</td><td>B</td><td>The table below shows the mean and standard deviation of the distances thrown in two events at a school athletics carnival.<br><table><tr><th>Event</th><th>Mean (m)</th><th>Standard deviation (m)</th></tr><tr><td>Javelin</td><td>32.0</td><td>4.0</td></tr><tr><td>Discus</td><td>27.0</td><td>3.0</td></tr></table>Tom's discus throw had a standardised score of $z$ = −0.8. The distance of Tom's discus throw, in metres, was</td><td>$x$ = 27.0 − 0.8 × 3.0 = 24.6 m. 23.8 uses the javelin standard deviation; 26.2 subtracts 0.8 m; 29.4 uses $z$ = +0.8.</td></tr>
</table>

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| | | | |
|---|---|---|---|
| 9 | **A** | The parallel boxplots below show the daily fine-particle air pollution readings (PM2.5, in micrograms per cubic metre) at two country towns, Ashby and Corrin, over 31 days in July.<br><br><br>Which one of the following statements is true? | Corrin's $Q_3$ (11) is below Ashby's median (12), so at least 75% of Corrin's readings are lower. B is false (9 < 12); C gives $Q_3$, not the IQR (16 − 9 = 7); D: Ashby is positively skewed. |
| 10 | **D** | The equation of the least squares line is closest to | From the line: about 331 ms at 5 hours and 238 ms at 10 hours, slope ≈ −18.6, intercept 331 + 5 × 18.6 ≈ 424 (CAS: 423.9, -18.56). A reads the value at the left edge of the plot (5 hours) as the intercept; B has the wrong sign; C reverses the variables. |
| 11 | **D** | The coefficient of determination for these data is 0.961<br>Which one of the following statements is correct? | $r^2$ = 0.961 gives 96.1% of the variation in the response variable (reaction time) explained by the explanatory variable (sleep time). A reverses the variables; B quotes $\|r\|$ as a percentage; C misreads explained variation as a percentage of people. |
| 12 | **D** | A study of 150 Australian towns found a strong positive association ($r$ = 0.82) between the number of public tennis courts per 10 000 people and the average life expectancy of residents.<br>Which one of the following conclusions is valid? | An observational association does not establish cause and effect, so A and B are invalid; C uses $r$ instead of $r^2$ ($0.82^2 \approx 0.67$). |

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