

General Mathematics 1 Exam – MA072

2025 VCE Assessment Guide

VCAA Marking Policies and Procedures

Consistency of Marking

The Assessment Guide indicates the basis for awarding marks for each item. This may involve either counting correct answers/features of a response or marking holistically, whereby making a judgement about the overall quality/qualities of a response.

The Assessment Guide will demonstrate how marks are to be awarded for a response, not where or how marks are to be deducted. The Assessment Guide will address specific examples and relevant application where appropriate. The following provides a checklist that all assessors should follow for consistent approaches to marking VCE external examinations.

Assessors should contact the Chief Assessor in cases where they believe that by following any of the directions below, a student will not be marked fairly.

Assessors must use the final version of the Assessment Guide as confirmed at the end of the Assessor Training Meeting.

Concern	Advice
Responses 'off task' or contradictory	A response that does not address the subject of the question cannot be awarded any marks. If contradictory responses are given (i.e.: the response conflicts with earlier comments or working out) full marks cannot be awarded.
Responses not addressed in the Assessment Guide	Assessors should refer the matter to the Chief Assessor for determination.
Spelling	Unless otherwise instructed in the Assessment Guide (i.e.: as part of a criteria), incorrect spelling should not affect the scoring of a student's response.
Specified Number of Examples/Reasons	Where a student provides more than the required number, the assessor should only assess the required number of responses. These should be assessed in the order in which they appear.
Working Out	Where a question explicitly requires the student to show working out, and this is specified in the examination instructions or in the question, full marks should be awarded if: <ul style="list-style-type: none"> • The response is correct and the working out is correct • Two sets of working out are shown, both attempts are correct, and the answer is correct

	Where a question explicitly requires the student to show working out, partial marks should be awarded for correct completion of key steps required to produce the correct answer.
Consequential Errors	Where a question requires a series of sequential steps to arrive at the correct response, the Assessment Guide will allocate marks for the key steps required to produce the correct response. In these cases, the effect of a consequential error on a subsequent response will be considered.
Half Marks	Half marks must not be awarded for a response or carried over to subsequent questions.
Crossing Out	If a student response has been crossed out, the part crossed out should not be considered. If the entire response is crossed out, this is awarded zero ('0').
Modules	Where a student responds to more modules than required, the assessor must assess all responses.
Options	Where a student responds to more than one option, the assessor must assess all responses according to the criteria in the Assessment Guide and award the student the highest score, indicating the option selected.
Not Attempted vs Zero (0)	Where a student has not made a genuine attempt to respond to the question, assessors should score the response as 'Not Attempted'. This may include: <ul style="list-style-type: none"> • Blank responses • 'I don't know' • Repeating the question, task, source material, or any other text directly from the examination • A response with no relevance to the question Where a student has made a genuine attempt to respond to the question, assessors should score the response as '0' (zero) where: <ul style="list-style-type: none"> • The student has crossed out their whole response or • The student's response does not meet the assessment criteria to be awarded any marks

Student Concern

Occasionally, assessors encounter a response that may raise concerns about the welfare of the student. Examples may include:

- suggestions or claims of abuse or neglect
- indications of distress, self-harm or suicidal tendencies
- threats of violence, harm, or criminal acts involving others.

In such cases, assessors should assess the student work in accordance with the Assessment Guide and send the student script/item to be reviewed according to the instructions on the next page.

Any matter of concern that an assessor believes requires urgent attention should be referred to the VCAA immediately via call to the VCAA Helpdesk: 1800 820 122.

Sending Student Responses to Review

During marking, assessors may identify student responses to be escalated for review by the Chief Assessor or to be noted by VCAA staff. The review categories are:

Category	To be used when:
Assessment guide	There is confusion of how to mark this item.
Image problem	The item cannot be viewed properly, i.e.: folded page, blurry, too faint to read, etc. This is not for responses that have difficult-to-read handwriting.
Incomplete student work	The student appears to be missing part of their response or has indicated it continues in another area that is not attached.
Incorrect writing task	The item is in the wrong place in marking platform, or the student has written in the wrong place, i.e.: response to Q5b is written in Q5a.
Student concern	There are concerns for the student's welfare.

Below are some examples of issues and corresponding actions to take:

Issue	Action
Evidence of student distress or concern. Note: Student concern does not include unfinished work or work that is off-task.	Assess the student response using the Assessment Guide. Send the student response for review, selecting the 'student concern' review category.
The student's handwriting is too faint to read, and you are unable to read and score the student response accurately. Note: Some student responses may include different handwriting or typed responses. This is usually due to Special Examination Arrangements and therefore does not need to be reported to the VCAA.	Make every effort to read the student's work. If unable to read the response, send the script for review, selecting the 'illegible response' review category.
The student's response appears to be unfinished, or they have indicated their response continues on another page that is not attached.	Refer to the Assessment Guide and score this as the student's response, and send the student response for review, selecting 'incomplete student work' review category.
The control of the mechanics of language is not sufficient to communicate a coherent response.	Refer to the Assessment Guide and score this as the student's response. You may contact the Chief Assessor for advice on how best to score the response.
Responses in Languages other than English	Unless otherwise stated, responses in a language other than English should not be awarded marks and should be scored zero (0).

Marking Guide

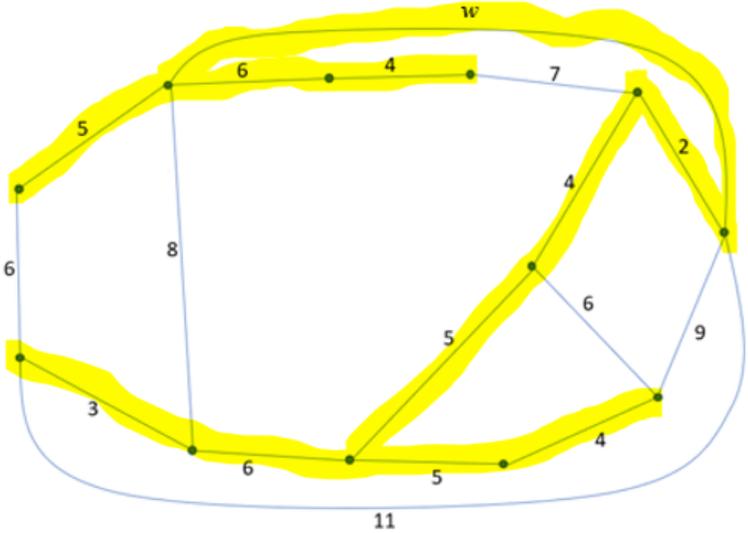
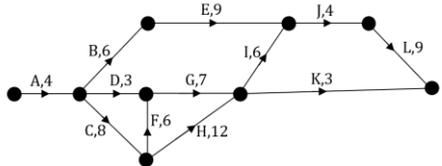
Question Number	Key	Worked Solution
1	D	Sum all columns = $4 + 11 + 3 + 9 + 5 + 7 = 39$ The 20th value will be in the fourth column (bag size 4)
2	D	Total = $1 \times 4 + 2 \times 11 + 3 \times 3 + 4 \times 9 + 5 \times 5 + 6 \times 7 = 138$
3	D	Min sample T ≈ 68 . Med sample H ≈ 67 . Therefore min Sample T $>$ median Sample H.
4	D	Population density = $6\,028\,460/720 = 8372.8611$ $\text{Log}_{10}(8372.8611) = 3.92287$
5	C	SOLVE($m + 2s = 178.9$ and $m - s = 157.6$,m,s) gives $m = 164.7$ and $s = 7.1$
6	C	Lower fence = $74.9 - 1.5 \times (78.5 - 74.9) = 69.5$ Three (3) of the listed values are less than 69.5, hence outliers
7	B	$42/(28 + 42 + 35) = 40\%$
8	D	Display categorical data (gender) against numerical data (number/percentage of individuals). Each bar is a gender with the segments being number/percentage of respondents for each colour.
9	A	By using a CAS calculator and inputting the data, a regression equation is calculated with a gradient of -0.1776913 which rounds to -0.178 . Whilst 2 points can be taken from the graph for an equation to be created, the points cannot be considered to be exactly on the axis values. This method results in the closest value of -0.1764706 (Using points (27, 12) and (44, 9), Gradient = $(12 - 9)/(27 - 44) = -0.176$) which is close to but not exactly -0.178 , however is closest to the correct option A. If using the initial and final locations of the regression line, the gradient comes out to be -0.173 . This is negative so option D cannot be correct. $12 = -0.176 \times 27 + c$, giving $c = 12 + 4.75 = 16.75$

Question Number	Key	Worked Solution																						
10	D	Options B and C are out, since we don't do cause. Clearly option D is correct from graph or correlation coefficient interpretation																						
11	C	After correct transformation, the data for the least square equation is <table border="1" style="margin: 10px auto;"> <tr> <td><i>doctors</i></td> <td>0.21</td> <td>0.42</td> <td>0.59</td> <td>0.79</td> <td>1.12</td> <td>1.42</td> <td>1.72</td> <td>1.77</td> <td>1.94</td> <td>2.05</td> </tr> <tr> <td>$\log_{10}(\textit{life})$</td> <td>1.810</td> <td>1.809</td> <td>1.811</td> <td>1.814</td> <td>1.819</td> <td>1.824</td> <td>1.836</td> <td>1.851</td> <td>1.868</td> <td>1.898</td> </tr> </table> <p style="text-align: center;">Least squares equation: $\log_{10}(\textit{life}) = 1.7879... + 0.038298... \times \textit{doctors}$</p>	<i>doctors</i>	0.21	0.42	0.59	0.79	1.12	1.42	1.72	1.77	1.94	2.05	$\log_{10}(\textit{life})$	1.810	1.809	1.811	1.814	1.819	1.824	1.836	1.851	1.868	1.898
<i>doctors</i>	0.21	0.42	0.59	0.79	1.12	1.42	1.72	1.77	1.94	2.05														
$\log_{10}(\textit{life})$	1.810	1.809	1.811	1.814	1.819	1.824	1.836	1.851	1.868	1.898														
12	C	After correct transformation, the data for the least square equation is <table border="1" style="margin: 10px auto;"> <tr> <td><i>doctors</i>²</td> <td>0.044</td> <td>0.176</td> <td>0.348</td> <td>0.624</td> <td>1.254</td> <td>2.016</td> <td>2.958</td> <td>3.133</td> <td>3.764</td> <td>4.203</td> </tr> <tr> <td><i>life</i></td> <td>64.6</td> <td>64.4</td> <td>64.7</td> <td>65.1</td> <td>65.9</td> <td>66.7</td> <td>68.6</td> <td>70.9</td> <td>73.8</td> <td>79.1</td> </tr> </table> <p style="text-align: center;">Least squares equation: $\textit{life} = 63.1165... + 2.8419... \times \textit{doctors squared}$. Hence predicted $\textit{life} = 63.1165 + 2.8419 \times 2^2 = 74.48 \approx 74.5$</p>	<i>doctors</i> ²	0.044	0.176	0.348	0.624	1.254	2.016	2.958	3.133	3.764	4.203	<i>life</i>	64.6	64.4	64.7	65.1	65.9	66.7	68.6	70.9	73.8	79.1
<i>doctors</i> ²	0.044	0.176	0.348	0.624	1.254	2.016	2.958	3.133	3.764	4.203														
<i>life</i>	64.6	64.4	64.7	65.1	65.9	66.7	68.6	70.9	73.8	79.1														
13	C	Values with week 8 in the middle: 50, 38, 32, 35, 41 In rank order: 32, 35, 38, 41, 50 Median = 38																						
14	D	Time series shows decreasing trend with irregular fluctuations																						
15	B	Calculation1: $(78 + 187 + 106 + 166)/4 = 134.25$ Calculation2: $(187 + 106 + 166 + 124)/4 = 145.75$ Centring = $(134.25 + 145.75)/2 = 140$																						
16	B	From $A = ID$ we get $D = A/I = A/1.75 = 0.57 \times A$ This means a reduction by 43% (option B).																						
17	D	Balance = $P + I = P + \frac{PRT}{100} = 4000 + \frac{4000 \times 4 \times 3}{100}$ $= 4000 + 4000 \times 0.04 \times 3$																						

Question Number	Key	Worked Solution
18	D	For an arithmetic sequence, $R = 1$ and $d \neq 0$. Reject options A and B For a geometric sequence to increase, $R > 1$ and $d = 0$. Reject option C.
19	B	Flat Rate reduces by \$4000 per year. Reducing Balance reduces by $55\,200/60\,000 = 0.92$. SOLVE ($60\,000 - 4000n = 60\,000 \times 0.92^n$, n) gives $n = 5.582\dots$ Flat Rate will first be lower after 6 years. Another method may be used.
20	A	Loss of value = $\$12\,000 - \$7680 = \$4320$ Hours used = $960 \times 2 = 1920$ Depreciation per hour = $\$4320 \div 1920 = \2.25
21	C	Annual payment = 5% of $\$250\,000 = \$12\,500$ Years required = $\$250\,000 \div \$12\,500 = 20$ (pays exactly $\$250\,000$) Hence one more year required!
22	A	Using Finance Solver to find interest rate, where, $N = 3 \times 52$, $PV = 4000$, $Pmt = 50$, $FV = -14\,000$, $CpY = PpY = 52$ $I\% = 8.3723\dots \approx 8.4\%$
23	B	Nominal interest rate = $\text{nom}(4.51, 26) = 4.415\%$ p.a. Using Finance Solver to find total balance, where, $N = 5 \times 26$, $I\% = 4.415$, $PV = 5000$, $Pmt = 00$, $CpY = PpY = 26$ $FV = \$6233.8910\dots \approx \6233.89 Interest earned = $\$6233.89 - \$5000 = \$1233.89 \approx \1234
24	A	Using Finance Solver to find time to given balance, where, $I\% = 4.8$, $PV = 800\,000$, $Pmt = -6000$, $FV = 521\,118.96$, $CpY = PpY = 12$ $N = 84.0000\dots = 84$ payments = 7 years Using Finance Solver to find time to exhaust annuity, where, $I\% = 4.8$, $PV = 521\,118.96$, $Pmt = -4767.66$, $FV = 0$, $CpY = PpY = 12$ $N = 144.000\dots = 144$ payments = 12 years Total length of annuity = $7 + 12 = 19$ years

Question Number	Key	Worked Solution
25	A	Binary matrix- only contains 1s and 0s Eliminate B Not P as two 1s in second row Eliminate C as 1s not on Lead Diagonal Eliminate D as values not on Lead Diagonal
26	C	Row \times column $1 \times 3 + 6 \times 5$
27	C	Understanding of inverse needing $\det \neq 0$ so can work out. $\det = mn - (-9 \times 4) = mn + 36$ Options A, B and D give $\det = 36 + 36 = 72$ Option C gives $\det = -36 + 36 = 0$ (No inverse!)
28	C	Checking each option: A A cannot directly communicate with C B B cannot directly communicate with E C ALL direct links work D F cannot directly communicate with D
29	A	Check row 1 for correct birth rates, no loop so birth rate year 1 =0 Check survival rates B has birth and survival rates in wrong spots C has birth rates starting at age 1 not 2 D has survival rate in the wrong columns
30	B	only 3 elements are negative once completed $\begin{bmatrix} 1^2-1 & 1^2-2 & 1^2-3 & 1^2-4 \\ 2^2-1 & 2^2-2 & 2^2-3 & 2^2-4 \\ 3^2-1 & 3^2-2 & 3^2-3 & 3^2-4 \\ 4^2-1 & 4^2-2 & 4^2-3 & 4^2-4 \end{bmatrix} = \begin{bmatrix} 0 & -1 & -2 & -3 \\ 3 & 2 & 1 & 0 \\ 8 & 7 & 6 & 5 \\ 15 & 14 & 13 & 12 \end{bmatrix}$

Question Number	Key	Worked Solution
31	B	<p>Eliminate A. $A + B$ is not defined</p> <p>Eliminate C. $BD = 3 \times 3$ which cannot be added to C</p> <p>Eliminate D. DA is not defined</p>
32	B	<p>Kyle's two wins are defeating Maggie and Neil (given) Therefore, Kyle must lose to Lian and Ophelia. Hence, Lian defeats Kyle but loses to Maggie, Neil and Ophelia. Hence, Neil defeats Lian but loses to Kyle, Maggie and Ophelia.</p> <p style="text-align: center;"><i>K L M N O</i></p> <p>Hence $D = \begin{matrix} K \\ L \\ M \\ N \\ O \end{matrix} \begin{bmatrix} 0 & 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 \end{bmatrix}$ (which happens to be option D)</p> <p>Correct $D + D^2$ gives option B</p>
33	B	Only 2 Hamiltonian cycles can be created when starting at E, forward and backwards around the graph.
34	C	Top 3 edges, when removed, cause the graph to be disconnected.

Question Number	Key	Worked Solution
35	B	 <p>As a result $5 + 6 + 4 + w + 2 + 4 + 5 + 3 + 6 + 5 + 4 = 44 + w$</p>
36	A	There are 4 edges going into the cut: 7, 3, 5 and 12 that total 27
37	B	Minimum cut will be $7 + 4 + 6 = 17$
38	A	The shortest path is via 900, 500, 400, 800, 1100 = 3700
39	B	After row and column in that order it is table B. Table A is after row reduction, Table C is after just column, and Table D is after Column and then row.
40	C	 <p>The network above is created, and this requires a dummy between the end of B and start of G The latest start of B is 12 and the earliest is 4, Float of 8.</p>