Specialist Mathematics Exam 2 – MA093

2024 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.

Assessment Guides 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, and 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:* 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** | If a question requires a series of argued/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. |
| **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 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:* 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, i.e.: song lyrics

Where a student has made a genuine attempt to respond to the question, assessors should score the response as ‘0’ (zero) where:* 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 instruction 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 helpdesk.**

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 | Description |
| **Illegible response** | You are unable to read the student’s response. |
| **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 as an attachment. |
| Possible connection to student | You recognise the student’s work. Please provide details. |
| Student concern | There is evidence of student distress. |
| Technical Issue (VOSS Helpdesk) | You are not able to continue scoring this exam or item due to a technical issue. Only use this category if you have contacted VOSS support on 1800 820 122.  |

Below is a list of common issues that may arise, and how to respond to these:

|  |  |
| --- | --- |
| 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 1** (10 marks)

**Answers**

**a. (annotations for marking on left side of diagram below, should be repeated on right side for symmetry)**



Three branches drawn correctly 1A

* graph central region, “flatish”,
* graph should be within half-a-grid square and (0.8, 2),
* two turning points below -axis should be on the line and half-a-grid square either side of ,
* graph should exit left and right sides of the grid between and

Two asymptotes drawn & labelled 1A

Three stationary points labelled with coordinates 1A

**b.i.** Attempt to solve for  to use in  - might have sign errors 1M

  OR 

 Correct integral with terminals and  1A

**b.ii.** 11.2 (pay for 3.6 if pi omitted in **part.i.**) 1A

**c.**  1A

**d.i.**  1A

**d.ii.**  1A

**d.iii.**  1A

If get all three wrong, pay one mark out of three if the 'directions' of at least two the above **four inequality signs** are correct, pay it as the second mark in this case.

**Question 2** (10 marks)

**a. ** or equivalent, need to eliminate *i*1M

 **** 1A

 **OR** (1, 2) & (4, 0) grad is , grad = , 

midpoint , ,  (1M)

Method mark for attempting to find gradient, midpoint & value of *c*

**b.** midpoint is, radius is , attempt at both 1M

So **** 1A

**c.**

****

Circle correctly sketched 1A

 Correct *y* - intercept values as shown above, can be co-ords. 1A

 Accept Imaginary intercepts of 

**d.i.** ray as shown [origin point at must be open] 1A

**d.ii.**  or  1A

 **e.**  or other method shown 1M

  1A

**Question 3** (10 marks)

**a.**  (cubic metres per day) when *t* = 2 1A

**b.**  correct chain rule relation applied 1A

  terms put in place, can have errors in 1M

  = 0.51 1A

**c.i. ** can leave out 1A

**c.ii.**  1A

**d.** Max Volume **=**  1A

, so max 1H

[H mark using their in part **b.** above]

**e.**  1M

Need an equation involving 'one time variable' and attempt to integrate or use previous result

 **[**If with **supporting working** then award method mark.]

gives  1A

 OR might have  etc

if no five day time offset then and can only get method mark.

OR Integral equation approach may be used:

And solving for gives

**Question 4** (11 marks)

**a. , **

 **** or ** -** need to see either of these

 **, ** Convincing 'show that'.1A

**b.**



 Correct path shown 1A

 Arrow showing direction & coordinates of endpoints labelled. 1A

[note that so endpoints must not be below or above , curve should have a vertical tangent at the -intercept and we want to see a hyperbolic shape with no sharp points]

**c.i. ** 1A

[or , other equivalents must have only secant functions]

**c.ii.  (**minutes) 1A

**c.iii.** 2 1A

**c.iv. ** 1A

**d. i. ** or use answer to **c.i.** 1M

Need to see an integrand and correct terminals for method mark.

 Can omit .

 common alternate form:

 **ii. ** 1A

**e. ** 1M

- or something equivalent, indicating method being applied.
[for vector expressions with derivatives we need to see on the path to solution]

  (If correct and have something indicating method - full marks) 1A

**Question 5** (10 marks)

**a.**  *[vector notation required]* 1A

 OR 

 OR either of these with direction vector reversed.

 Other possibilities exist.

**b.** A vector from *A* to a point on the line, say is . Must use a point on the line for method mark. 1M

Scalar resolute :must use unit direction 1M

 Distance =  1A

 OR  vector from *A* to line (1M)

  getting a function to work with (1M)

 then minimising this function gives . (1A)

 OR where is a point and is the perpendicular direction.

**c.** ,  find two vectors in plane 1M

 [for reference in coordinate form]

  using cross product to find a normal 1M

 ****  1A

**d.i. , , ** 1A

**d.ii.** 

 cross product between any two spanning vectors 1M

  =  [accept ] 1A

Other working for **5dii.**

 OR Heron's Rule - standard

 (CAS Define) , =261 (1M)

 'ctrl enter' gives 261.  (1A)

 OR Heron's Rule - variant (rare)

 

  (1M)

 .  (1A)

 OR Cosine Rule - Might find other angles and use half base x height

 ,  (1M)

 **, ** (1A)

**Question 6** (9 marks)

**a.** ,  1A

**b.i.** ,  so  1A

**b.ii.** , so pause machine – want the word 'pause' used - not ‘reject ’ 1H

[answer relative to their -value]

**c.** Lower 5% tail cut off for is - critical 

 critical  – attempt to find or find critical value 1M

 = 0.31 [accept ] 1A

**d.** ,  1A

**e.**  gives  [accept ] 1A

**f.**  1A

**g.** , ,  so take  1A