2024 VCE Mathematical Methods 2 (NHT) external assessment report

Specific information

This report provides sample answers or an indication of what answers may have included. Unless otherwise stated, these are not intended to be exemplary or complete responses.

Section A – Multiple-choice questions

| **Question** | **Correct answer** | **Comments** |
| --- | --- | --- |
| 1 | C |  |
| 2 | A |  |
| 3 | D |  |
| 4 | A |  |
| 5 | B |  |
| 6 | C |  |
| 7 | B |  |
| 8 | B |  |
| 9 | D |  |
| 10 | A |  |
| 11 | E |  where .The number of days with at least 11 hours of daylight during one year, 365 days, is  days.The graphs of  where  and  are shown below. |
| 12 | C |  |
| 13 | D | , as  , as      |
| 14 | D | The algorithm stops when ., , Check alternatives, ,  Since ,  |
| 15 | D | , Solve , , but  is discrete., The minimum cost is closest to . |
| 16 | A |  |
| 17 | D | , ,  and  are independent. |
| 18 | D | , To get the smallest value of  such that there is a unique solution to  and a unique solution to ,  must equal 1 when  and only at .Solve , ,  is the smallest value. This value can also be found using the slider functionality on CAS.The graph of  when  is shown below. A graph of mathematical equations  Description automatically generated |
| 19 | C |  when ,  when  So , when . when ,  when So , when only. |
| 20 | E |  and  translates the graph of  horizontally. For  to be an absolute maximum, the graph of  has to be translated at least  units to the left. So . The maximum value the graph of  can be translated to the right is  units.The minimum value occurs when  which is when .Hence, .These values can also be found using the slider functionality on CAS.Part of the graph of  is shown below. |

Section B

Question 1a.



Question 1b.

Solving  or 

 and 

Question 1ci.



Question 1cii.



Question 1di.

 gives 

The tangent line is given by , where  as it goes through the origin

Therefore

Question 1dii.





Question 1diii.



Question 2a.

, 1

Question 2b.



 or 

Question 2c.

 (Point A)

Question 2d.



Question 2e.

 times

Question 2f.



Question 2gi.







Question 2gii.



Question 2giii.





Question 3a.

2.1

Question 3b.



Question 3c.





Question 3di.

10

Question 3dii.

4

Question 3diii.



 or 

Question 3ei.

 or 

Question 3eii.



Question 3f.





Question 4a.

The graph must be drawn and labelled.



Question 4b.

, 



Question 4c.

, 

OR

, 

Question 4d.



Domain 

Question 4e.

, 

Question 4f.

or  (area of square)



Alternative methods were possible.

Question 4g.

, 

, angle is 

Question 4h.

Some of the equations are shown below. There are other possibilities.

 LHS upper

 RHS lower

 RHS upper



Question 5a.

Inverse: 



Domain of  is range of which is .

Question 5b.



 

Question 5ci.



Question 5cii.

The graphs must be drawn correctly.

Asymptotes must be labelled with their equations.

The coordinates of the point of intersection must be shown with exact values.



Question 5di.



Question 5dii.



Question 5e.

|  |  |
| --- | --- |
| Number of points  | Value(s) of $a$ |
| 0 |  |
| 1 |  |
| 2 |  given |
| 3 |   |