2023 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 | Correctanswer | Comments |
| --- | --- | --- |
| 1 | B |  |
| 2 | C |  |
| 3 | D | The maximal domain the function *f*, with rule , is strictly decreasing is . |
| 4 | E |  |
| 5 | B |  |
| 6 | E |  |
| 7 | A |  |
| 8 | A |  |
| 9 | C |  |
| 10 | B |  |
| 11 | D | ,  using the product and chain rules |
| 12 | C |  |
| 13 | D |  |
| 14 | A |  |
| 15 | E |  |
| 16 | B |  |
| 17 | E |  |
| 18 | A |  as a fee is deducted from the initial investment,  |
| 19 | D | The graph of  has a tangent with a maximum horizontal intercept when .An example is shown above for . |
| 20 | D |  |

Section B

Question 1a.



Question 1b.

,  or , 

Question 1c.

Method 1:

Solving  for 



Method 2:

 has a $y$-intercept at (0, 3)

*k* is a vertical translation, so for  to pass through the origin 

Question 1d.

Method 1:

 has $x$-intercepts at  and 

*d* is a horizontal translation, so for to pass through the origin

 or 

Method 2:

Solving  for  gives

 or 

Question 1e.

Dilation by a factor of  from the *y*-axis (in the direction of the *x*-axis)

Question 1f.



At , 



Question 1g.

Method 1:

Using the discriminant condition 





Method 2:

, Solving 



Question 1h.



, , 

 Solving  or 

 or 

Two pairs (examples)

, 

, 



Question 1i.





Question 2a.



Question 2b.

Solving  for 

898 minutes which is hours  minutes

Question 2c.





Question 2d.

Strictly decreasing

Question 2e.

 is not continuous at  and so is not continuous for 

, 

Question 2f.





Question 2g.



Question 2h.

Solving 



Question 3a.

 or  or 

Area 

Question 3b.



 

Question 3c.

The graph only has turning points for and so to form the rectangle connecting the turning points we must have this restricted range of  values.

If , area = 0,  has one stationary point.

If ,  no real solution,  has no turning points.

Question 3d.



 

  as required

Question 3e.



 

Question 3f.

, 

, 



Question 4a.



Question 4b.



Question 4c.

The mean will remain unchanged.

The standard deviation will decrease: standard deviation 

Question 4d.



Question 4e.



Method 1:

Solving  or 



Method 2:

,  or , 



Method 3:







Question 4f.

Let 



Question 5a.



Question 5b.



Question 5ci.

 or , where 

Question 5cii.



Question 5di.

, 

Question 5dii.

, 

Question 5diii.



Question 5e.

, 