Cape Unit 2 Paper 2

2013 Solutions

1. (a) 



But, hence the gradient is undefined at (1, 0). [vertical tangent]

OR









But, hence the gradient is undefined at (1, 0).

(b) 







(c) 











(d) (i) 







(ii) 







2. (a) (i) 







OR





















OR







(ii) 



OR





(b) (i) 

the ordinates are 

Area

square units

(c) (i) 



coeff;

coeff ; 

coeff;

constant 



OR









(ii) 















3. (a) , 

Let be the proposition that 

At , , so is true

Assume that is true for some  i.e. 

Let 

Since is true, we have



and 

Hence and follows, is true for all 

(b) (i) (a) 





(b) 





(ii) 



(c) (i) 









(ii) 



4. (a) (i) 





(ii) 







(b) 







the coefficient of the term is multiply the two RHS





OR

let the coefficient of 



 



OR

 

 occurs when  coeff of 



(c) (i) at 

is continuous

by the IVT there is a root within 

(ii)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *n* | *an* | *bn* | *Pn* | *f*(*Pn*) |
| 4 | 2.875 | 3 | 2.9375 | 0.347>0 |
| 5 | 2.875 | 2.9375 | 2.9063 | - 0.0517<0 |
| 6 | 2.9063 | 2.9375 | 2.9291 | - 0.543 < 0 |
| 7 | 2.9219 | 2.9375 | 2.9297 | 0.146 > 0 |
| 8 | 2.9219 | 2.9279 | 2.9258 | 0.045 > 0 |

Let 

5. (a)

*V*



*V*





*C*



*V*





*C*

*V*



*C*















*C*

*C*

*V*

*V*

*C*

*V*

*C*

(b) (i) 



The system is not consistent since the third row is 0 0 0 = 9

(ii) 



Solution is unique since only the leading diagonal elements

are non-zero and equal to 1.

Solve for *x*, *y*, *z*.

(c) (i) 







(ii) 





6. (a) (i) 











(ii) 







(b) 

(i) (a) 





(b) 

(ii) 











(iii) 













Particular solution

