1.14 Core Pure: Further Calculus and Series Depth: 10-minute Pack

EDEXCEL 9FM0 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 This question is about the series with r-th term $u_r = 5/(r(r + 3))$.

(a) Show that $5/(r(r + 3)) = (5/3)(1/r - 1/(r + 3))$. **(2)**

(b) Use the method of differences to find the sum from r = 1 to n of u_r, and evaluate the sum from r = 1 to 11. **(4)**

(c) Hence find the sum to infinity of the series. **(2)**

(Total for Question 1 is 8 marks)

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Mark scheme · 1.14 Core Pure: Further Calculus and Series Depth: 10-minute Pack

Question 1

(a) writes 1/r - 1/(r + 3) over a common denominator	**M1**
(a) = 3/(r(r + 3)) and multiplies by 5/3 (cso)	**A1**
(a) Answer: 5/(r(r + 3)) = (5/3)(1/r - 1/(r + 3))	
(b) writes out the first few and last few terms and cancels	**M1**
(b) the remaining terms: (1 + 1/2 + 1/3) - (1/(n + 1) + 1/(n + 2) + 1/(n + 3))	**A1**
(b) S_n = (5/3)[11/6 - 1/(n + 1) - 1/(n + 2) - 1/(n + 3)]	**A1**
(b) S_{11} = 2915/1092	**A1**
(b) Answer: S_{11} = 2915/1092	
(c) the terms in n tend to 0	**M1**
(c) 55/18	**A1**
(c) Answer: 55/18	

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