1.4 Further Calculus: 10-minute Pack

EDEXCEL 9FM0 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The region R is bounded by the curve $y = \sin(2x)$, for $0 \leq x \leq \pi/2$, and the x axis. R is rotated through 2pi radians about the x axis.

(a) Find the exact volume of the solid generated. **(4)**

(Total for Question 1 is 4 marks)

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2 This question is about improper integrals.

(a) Show that the improper integral of $1/x$ from $x = 1$ to infinity does not converge. **(3)**

(Total for Question 2 is 3 marks)

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Mark scheme · 1.4 Further Calculus: 10-minute Pack

Question 1

(a) $V = \pi$ integral of y^2 dx	**M1**
(a) uses $\sin^2(2x) = (1 - \cos(4x))/2$	**M1**
(a) integrates and substitutes the limits 0 and $\pi/2$	**M1**
(a) $V = \pi^2/4$	**A1**

(a) Answer: $\pi^2/4$

Question 2

(a) integrates: 1 ln x	**M1**
(a) evaluates between 1 and t	**M1**
(a) 1 ln t tends to infinity as t tends to infinity, so the integral diverges	**A1**

(a) Answer: diverges

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