

1. Use the binomial theorem to expand

$$\sqrt{4-9x}, \quad |x| < \frac{4}{9},$$

in ascending powers of x , up to and including the term in x^3 , simplifying each term.

(5)

Q1

(Total 5 marks)



2. A curve has equation

$$x^2 + 2xy - 3y^2 + 16 = 0.$$

Find the coordinates of the points on the curve where $\frac{dy}{dx} = 0$.

(7)

Q2

(Total 7 marks)



(5)

Q3



4. Use the substitution $x = \sin \theta$ to find the exact value of

$$\int_0^{\frac{1}{2}} \frac{1}{(1-x^2)^{\frac{3}{2}}} dx.$$

(7)



Question 4 continued

(Total 7 marks)

Q4



5.

Figure 1

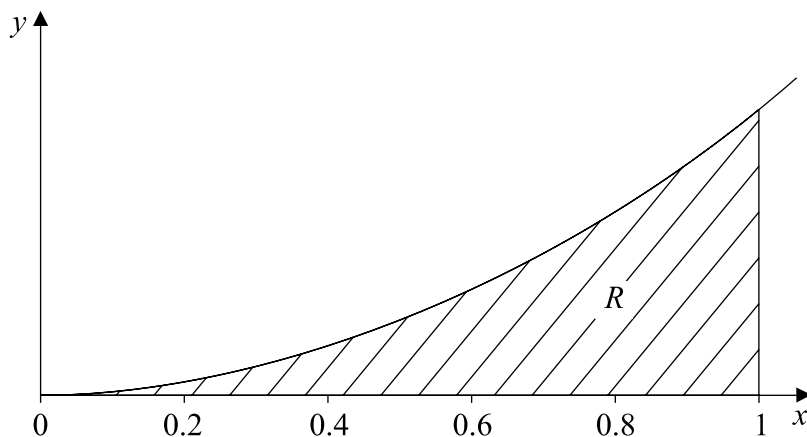


Figure 1 shows the graph of the curve with equation

$$y = xe^{2x}, \quad x \geq 0.$$

The finite region R bounded by the lines $x = 1$, the x -axis and the curve is shown shaded in Figure 1.

(a) Use integration to find the exact value for the area of R .

(5)

(b) Complete the table with the values of y corresponding to $x = 0.4$ and 0.8 .

x	0	0.2	0.4	0.6	0.8	1
$y = xe^{2x}$	0	0.29836		1.99207		7.38906

(1)

(c) Use the trapezium rule with all the values in the table to find an approximate value for this area, giving your answer to 4 significant figures.

(4)





Q5





Question 6 continued

(Total 12 marks)

Q6





Q7





Question 8 continued

(Total 13 marks)

TOTAL FOR PAPER: 75 MARKS

END

Q8



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