

7 (a) Given that k is a constant such that $\frac{27^{(x+2)} - 3^{(3x+5)}}{3^x \times 9^{(x+2)}} = k$

find the value of k .

(5)

(b) Find the exact roots of the equation $2\log_2 y + 3\log_y 2 = 7$

(6)

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Question 7 continued

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Question 7 continued

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(Total for Question 7 is 11 marks)



8 [In this question, \mathbf{p} and \mathbf{q} are non-zero and non-parallel vectors.]

O, A, B and C are fixed points such that

$$\overrightarrow{OA} = 5\mathbf{p} - 3\mathbf{q} \quad \overrightarrow{OB} = 11\mathbf{p} \quad \overrightarrow{OC} = 13\mathbf{p} + \mathbf{q}$$

(a) (i) Show that the points A, B and C are collinear.

(ii) Write down the ratio $AB:BC$.

(4)

The midpoint of OA is M and the midpoint of OB is N .

(b) Show that the ratio of the area of the quadrilateral $ABNM$ to the area of the triangle OAC is 9:16

(7)

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Question 8 continued

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Question 8 continued**(Total for Question 8 is 11 marks)**

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