Further calculus – AS Further Mathematics P1

1. June/2022/Paper_7366/01/No.7

The lines l_1 and l_2 have equations

$$l_1 : \mathbf{r} = \begin{bmatrix} 3 \\ 1 \\ -2 \end{bmatrix} + \lambda \begin{bmatrix} 3 \\ -4 \\ 1 \end{bmatrix}$$

$$l_2 : \mathbf{r} = \begin{bmatrix} -12 \\ a \\ -3 \end{bmatrix} + \mu \begin{bmatrix} 3 \\ 2 \\ -1 \end{bmatrix}$$

(a) Show that the point $P(-3, 9, -4)$ lies on l_1

[2 marks]

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(b) Show that l_1 is perpendicular to l_2

[2 marks]

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(c)   Given that the lines l_1 and l_2 intersect, calculate the value of the constant a

[4 marks]

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(d)   Hence, find the coordinates of the point of intersection of l_1 and l_2

[1 mark]

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