AQA – Further vectors – A2 Further Mathematics P1

1. June/2021/Paper_7367/1/No.11

The line L_1 has equation $\mathbf{r} = \begin{bmatrix} 2 \\ 2 \\ 3 \end{bmatrix} + \lambda \begin{bmatrix} 2 \\ 3 \\ -1 \end{bmatrix}$

The line L_2 has equation $\mathbf{r} = \begin{bmatrix} 6 \\ 4 \\ 1 \end{bmatrix} + \mu \begin{bmatrix} -2 \\ 1 \\ 1 \end{bmatrix}$

(a) Find the acute angle between the lines L_1 and L_2, giving your answer to the nearest $0.1°$

[3 marks]

(b) The lines L_1 and L_2 lie in the plane Π_1

(b) (i) Find the equation of Π_1, giving your answer in the form $\mathbf{r.n} = d$

[4 marks]

(b) (ii) Hence find the shortest distance of the plane Π_1 from the origin.

[1 mark]

(c) The points $A(4, -1, -1)$, $B(1, 5, -7)$ and $C(3, 4, -8)$ lie in the plane Π_2

Find the angle between the planes Π_1 and Π_2, giving your answer to the nearest $0.1°$

[4 marks]