Marked example 1

Paper 1 style · No calculator

1 6 marks AHL 3.17 ●●○ Typical

The points $A(1, 0, 2)$, $B(2, 1, 0)$ and $C(0, 3, 1)$ lie in the plane Π.

(a) Find $\overrightarrow{AB}$ and $\overrightarrow{AC}$. **[2]**

(b) Hence find a vector normal to Π. **[2]**

(c) Find the Cartesian equation of Π. **[2]**

MARKSCHEME (a)

$\overrightarrow{AB} = \begin{pmatrix} 1 \\ 1 \\ -2 \end{pmatrix}$ **A1**

$\overrightarrow{AC} = \begin{pmatrix} -1 \\ 3 \\ -1 \end{pmatrix}$ **A1**

Total 2 marks

MARKSCHEME (b)

$\overrightarrow{AB} \times \overrightarrow{AC} = \begin{pmatrix} -1+6 \\ 2+1 \\ 3+1 \end{pmatrix}$ **M1**

$\mathbf{n} = \begin{pmatrix} 5 \\ 3 \\ 4 \end{pmatrix}$ **A1**

Total 2 marks

Note Or any non-zero multiple.

MARKSCHEME (c)

$5 \times 1 + 3 \times 0 + 4 \times 2 = 13$ **M1**

$5x + 3y + 4z = 13$ **A1**

Total 2 marks

Note Substitute a point.

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