Marked example 2

Paper 1 style · No calculator

2 6 marks AHL 3.16 ●●○ Typical

The points $A(1, 0, 1)$, $B(3, 1, 1)$ and $C(1, 2, 3)$ are the vertices of a triangle.

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

(b) Find $\overrightarrow{AB} \times \overrightarrow{AC}$. **[2]**

(c) Find the area of the triangle ABC. **[2]**

MARKSCHEME (a)

$\overrightarrow{AB} = \begin{pmatrix} 2 \\ 1 \\ 0 \end{pmatrix}$ **A1**

$\overrightarrow{AC} = \begin{pmatrix} 0 \\ 2 \\ 2 \end{pmatrix}$ **A1**

Total 2 marks

MARKSCHEME (b)

$\begin{pmatrix} 1 \times 2 - 0 \times 2 \\ 0 \times 0 - 2 \times 2 \\ 2 \times 2 - 1 \times 0 \end{pmatrix}$ **M1**

$\begin{pmatrix} 2 \\ -4 \\ 4 \end{pmatrix}$ **A1**

Total 2 marks

MARKSCHEME (c)

$\frac{1}{2}\sqrt{4 + 16 + 16}$ **M1**

$\text{area} = 3$ **A1**

Total 2 marks

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