Exercise 2

Paper 1 style · No calculator

2 6 marks AHL 3.16 ●●○ Typical

The points $A(0, 1, 2)$, $B(2, 1, 0)$ and $C(2, 3, 2)$ 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]**

The markscheme is on the next page: try the question first. Written and verified by a practising IB mathematics teacher, produced with AI assistance; solved twice and recomputed by software. Not affiliated with or endorsed by the International Baccalaureate Organization.
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MARKSCHEME (a)

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

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

Total 2 marks

MARKSCHEME (b)

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

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

Total 2 marks

MARKSCHEME (c)

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

$\text{area} = 2\sqrt{3}$ **A1**

Total 2 marks