



QUESTION WORKBOOK

The vector product and the scalar triple product

Further Pure 1 · Year FM

6 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 State what $|\mathbf{a} \times \mathbf{b}|$ measures geometrically, and what $\mathbf{a} \cdot \mathbf{b} \times \mathbf{c}$ measures. [2]

A2 Find $\mathbf{a} \times \mathbf{b}$ for $\mathbf{a} = (2, -1, 3)$ and $\mathbf{b} = (1, 4, -2)$, and verify that it is perpendicular to $\mathbf{a}$. [3]

SECTION B · Standard

B1 Find the area of the triangle with vertices $A(1, 0, 1)$, $B(3, -1, 4)$ and $C(2, 4, -1)$. [4]

- B2** Find the volume of the tetrahedron with edges from the origin along $\mathbf{a} = (1, 1, 1)$, $\mathbf{b} = (2, 3, 1)$ and $\mathbf{c} = (0, 2, 4)$. [4]

- B3** Find the direction cosines of the vector $(1, 2, 2)$ and verify their defining property. [3]

SECTION C · Stretch

- C1** Explain what $\mathbf{a} \cdot \mathbf{b} \times \mathbf{c} = 0$ tells you about three non-zero vectors, and how this compares with $\mathbf{a} \times \mathbf{b} = 0$. [4]