



QUESTION WORKBOOK

Vectors in two dimensions

Vectors · Year 12–13

8 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 Find the magnitude of $\mathbf{a} = 5\mathbf{i} + 12\mathbf{j}$ and the unit vector in the direction of $\mathbf{a}$. [2]

A2 Given $\mathbf{p} = 2\mathbf{i} - 3\mathbf{j}$ and $\mathbf{q} = -\mathbf{i} + 4\mathbf{j}$, find $2\mathbf{p} + 3\mathbf{q}$. [2]

A3 Find the magnitude of $7\mathbf{i} - 24\mathbf{j}$, and the angle it makes with the positive x -direction, to 1 decimal place. [2]

SECTION B · Standard

B1 The points $A(-2, 3)$ and $B(4, -5)$ have position vectors $\mathbf{a}$ and $\mathbf{b}$. Find the vector $\mathbf{AB}$, the distance AB , and the midpoint of AB . [3]

B2 The vectors $4\mathbf{i} + 6\mathbf{j}$ and $6\mathbf{i} + \lambda\mathbf{j}$ are parallel. Find the value of λ . [3]

B3 Find the two vectors of magnitude 26 that are parallel to $5\mathbf{i} - 12\mathbf{j}$. [3]

SECTION C · Stretch

C1 For $\mathbf{a} = 3\mathbf{i} + 4\mathbf{j}$ and $\mathbf{b} = 6\mathbf{i} + 8\mathbf{j}$, show that $|\mathbf{a} + \mathbf{b}| = |\mathbf{a}| + |\mathbf{b}|$, and state the geometric condition under which this equality happens. [2]

C2 Show that the points $A(1, 2)$, $B(4, 8)$ and $C(6, 12)$ lie on a single straight line. [3]