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Vectors and Transformations

Student Worksheet

Questions & Working Space

IGCSE Mathematics

Name: _____

Date: _____

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Note

How to use this worksheet. These questions are built *strictly* on the *Vectors and Transformations* notes: vector notation and column vectors, magnitude, adding, subtracting and scaling vectors, parallel vectors, position vectors, midpoints and collinearity, and the four transformations (translation, reflection, rotation, enlargement) together with combined transformations.
Working space. Ruled lines are provided after each question — show *all* of your working there. Write vectors as column vectors, and always do *end* − *start* when finding a vector between two points. Harder questions have a teal **Hint** box; try the question first and use the hint only if you are stuck.
Checking your answers. Full step-by-step solutions, a marking scheme for the exam paper, and a quick answer key are in the separate booklet *"Vectors and Transformations — Solutions & Answer Key."* Try each question honestly before you look.

1 Part I — Topic-by-Topic Exercises

1.1 Vectors and Column Vectors

Exercise V1 *[Basic]*

P is the point $(1, 2)$ and Q is the point $(6, 5)$. Write $\overrightarrow{PQ}$ as a column vector.

Exercise V2 *[Basic]*

It is given that $\overrightarrow{AB} = \begin{pmatrix} 3 \\ -7 \end{pmatrix}$. Write down $\overrightarrow{BA}$ as a column vector, and explain in one sentence how the two vectors are related.

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Exercise V3 *[Standard]*

A is the point $(-2, 4)$ and B is the point $(3, -1)$. Find $\overrightarrow{AB}$ and $\overrightarrow{BA}$ as column vectors.

Exercise V4 *[Standard]*

C is the point $(7, 1)$ and $\overrightarrow{CD} = \begin{pmatrix} -4 \\ 6 \end{pmatrix}$. Find the coordinates of D.

Exercise V5 *[Intermediate]*

$A = (1, 5)$, $B = (4, -1)$ and $C = (9, 7)$. Find $\overrightarrow{AB}$, $\overrightarrow{BC}$ and $\overrightarrow{AC}$ as column vectors, and show that $\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AC}$.

Hint

Use *end* − *start* for each vector separately, then add the first two componentwise and compare with the third. This is the Triangle Law written in coordinates.

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Preview ends here

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