IGCSE Transformations – 7

Oct 04 Paper 4

4 Answer the whole of this question on a sheet of graph paper.

(a) Draw x- and y-axes from –8 to 8 using a scale of 1cm to 1 unit.
Draw triangle ABC with A (2, 2), B (5, 2) and C (5, 4). [2]

(b) Draw the image of triangle ABC under a translation of $\begin{pmatrix} -9 \\ 3 \end{pmatrix}$.

Label it $A_1B_1C_1$. [2]

(c) Draw the image of triangle ABC under a reflection in the line $y = -1$.
Label it $A_2B_2C_2$. [2]

(d) Draw the image of triangle ABC under an enlargement, scale factor 2, centre (6,0).
Label it $A_3B_3C_3$. [2]

(e) The matrix $\begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$ represents a transformation.

(i) Draw the image of triangle ABC under this transformation. Label it $A_4B_4C_4$. [2]

(ii) Describe fully this single transformation. [2]

(f) (i) Draw the image of triangle ABC under a stretch, factor 1.5, with the y-axis invariant.
Label it $A_5B_5C_5$. [2]

(ii) Find the 2 by 2 matrix which represents this transformation. [2]

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May 06 Paper 4

7 Transformation T is translation by the vector $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$.

Transformation M is reflection in the line $y = x$.

(a) The point A has co-ordinates (2, 1).

Find the co-ordinates of

(i) T(A), [1]

(ii) MT(A). [2]

(b) Find the 2 by 2 matrix **M**, which represents the transformation M. [2]

(c) Show that, for any value of k, the point Q $(k-2, k-3)$ maps onto a point on the line $y = x$ following the transformation TM(Q). [3]

(d) Find $\mathbf{M}^{-1}$, the inverse of the matrix **M**. [2]

(e) N is the matrix such that $\mathrm{N} + \begin{pmatrix} 0 & 3 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 4 \\ 0 & 0 \end{pmatrix}$.

(i) Write down the matrix N. [2]

(ii) Describe completely the **single** transformation represented by N. [3]