7. (i) $\mathbf{A} = \begin{pmatrix} -\frac{1}{2} & \frac{\sqrt{3}}{2} \\ -\frac{\sqrt{3}}{2} & -\frac{1}{2} \end{pmatrix}$

(a) Describe fully the single transformation represented by the matrix **A**.

(2)

The matrix **B** represents a stretch scale factor 2 parallel to the x-axis.

(b) Write down the matrix **B**.

(1)

The transformation represented by matrix **B** followed by the transformation represented by matrix **A** is the transformation represented by the matrix **C**.

(c) Determine **C**.

(2)

(ii) $\mathbf{M} = \begin{pmatrix} k & -2 \\ -1 & 2k \end{pmatrix}$ where k is a constant

Given that the transformation represented by matrix **M** maps the point (k, k) onto the point (35, 91)

(a) determine the value of k.

(4)

A quadrilateral Q is transformed to another quadrilateral Q' by the matrix **M**.

Given that Q' has area 336

(b) use the value of k found in part (ii)(a) to determine the area of Q.

(2)

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Question 7 continued

(Total for Question 7 is 11 marks)