7. (i)

$$\mathbf{M} = \begin{pmatrix} 1 & 0 \\ 0 & 3 \end{pmatrix}$$

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

(2)

The matrix **N** represents a reflection in the line with equation $y = -x$

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

(1)

The transformation represented by **M** followed by the transformation represented by **N** is the transformation represented by the matrix **P**.

(c) Determine **P**.

(2)

(ii)

$$\mathbf{Q} = \begin{pmatrix} 5 & -1 \\ 5 & 3 \end{pmatrix}$$

A **regular** hexagon H with side length x is transformed to another hexagon H' by the transformation represented by **Q**.

Given that the area of H' is 200, determine, to 3 significant figures, the value of x.

(5)

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Question 7 continued

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Question 7 continued

(Total for Question 7 is 10 marks)