7 The points with coordinates $(2, 2)$, $(5, 2)$ and $(4, -1)$ are the vertices of triangle A.

(a) On the grid, draw and label triangle A.

(1)

Triangle A is transformed to triangle B under the transformation with matrix $\mathbf{M}$ where

$$\mathbf{M} = \begin{pmatrix} 3 & \dfrac{1}{2} \\ -1 & -\dfrac{1}{2} \end{pmatrix}$$

(b) On the grid, draw and label triangle B.

(2)

Triangle B is transformed to triangle C under the transformation with matrix $\mathbf{N}$ where

$$\mathbf{N} = \begin{pmatrix} \dfrac{1}{2} & -\dfrac{1}{2} \\ \dfrac{1}{2} & \dfrac{1}{2} \end{pmatrix}$$

(c) On the grid, draw and label triangle C.

(2)

Triangle B is the image of triangle C under the transformation with matrix $\mathbf{P}$

(d) Find the matrix $\mathbf{P}$

(2)

Triangle A is transformed to triangle C under the transformation with matrix $\mathbf{Q}$

(e) Find the matrix $\mathbf{Q}$

(2)

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$$\left[\textbf{The inverse of matrix } \begin{pmatrix} a & b \\ c & d \end{pmatrix} \text{ is } \frac{1}{ad - bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}\right]$$
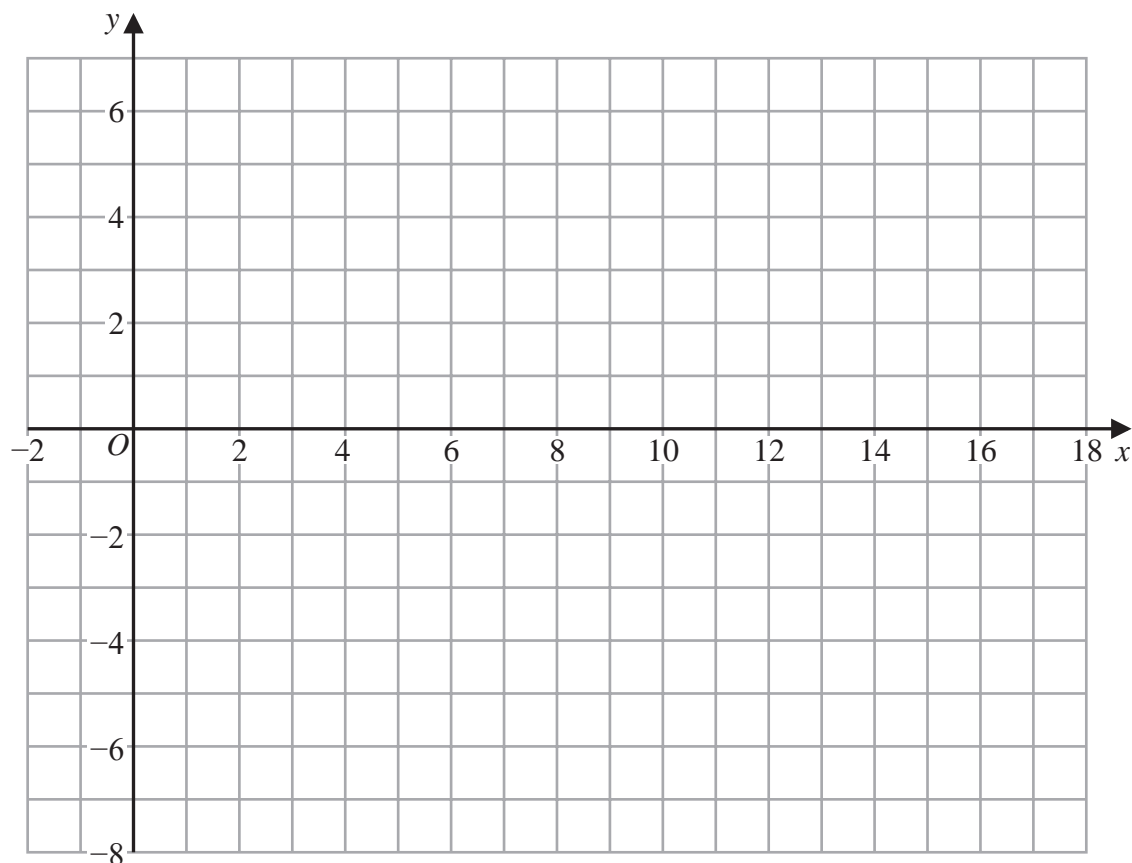
Question 7 continued

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Turn over for a spare grid if you need to redraw your triangles.

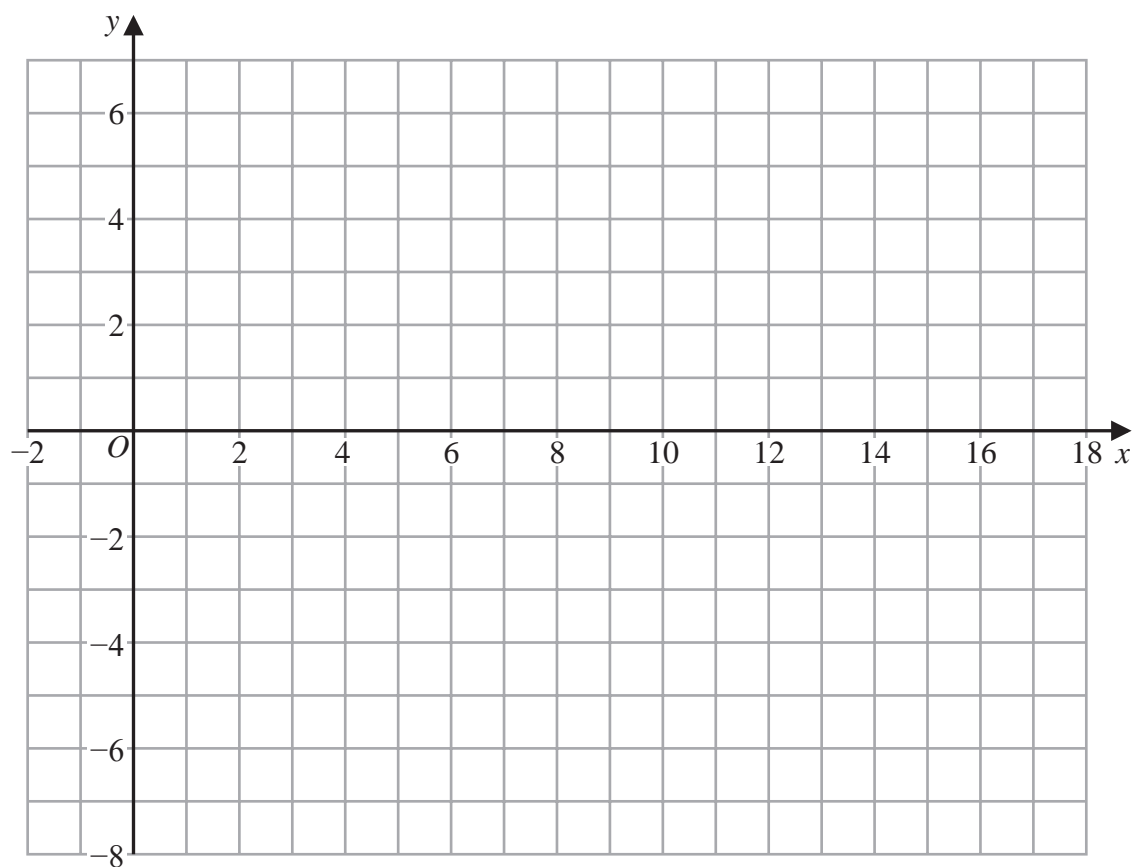**Question 7 continued**

Question 7 continued

Only use this grid if you need to redraw your triangles.

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(Total for Question 7 is 9 marks)