Question Number	Scheme	Notes	Marks
7	$\mathbf{M}=\begin{pmatrix}1 & 0\\ 0 & 3\end{pmatrix}$ $\mathbf{Q}=\begin{pmatrix}5 & -1\\ 5 & 3\end{pmatrix}$	Allow any (or no) brackets for matrices	
(i)(a)	A stretch, (scale) factor 3, parallel to the/in the/on the/up the/down the/along the/across the *y*-axis/ *y* direction/of the y-coordinates or vertically/ perpendicular to *x*-axis M1: Stretch. Must be a single transformation and no alternatives also offered. Ignore additional "and parallel to the *x*-axis scale of factor 1" & similar May be mis-spelt but must be an attempt at "stretch" - not e.g., "expansion". A1: Fully correct description. Just "in *y*" is insufficient. Accept surrogates for "factor" e.g., "scale" but not just "stretch of/by 3". Ignore reference to "about *O*"		**M1** **A1**
			(2)
(b)	$\{\mathbf{N}=\}\begin{pmatrix}0 & -1\\ -1 & 0\end{pmatrix}$	Correct matrix. No elements as trig expressions	**B1**
			(1)
(c)	$\{\mathbf{P}=\mathbf{NM}=\}\begin{pmatrix}-1 & 0\\ 0 & 3\end{pmatrix}$ Indicates intention to multiply the right way round. If this is set up as a grid multiplication then they must get a consistent answer. M0 if written the wrong way around even if the correct answer results. The **NM** must be seen if **N** is incorrect and their **N** must have at least two non-zero elements and cannot be **I**		**M1**
	$\begin{pmatrix}0 & -3\\ -1 & 0\end{pmatrix}$	Correct matrix. No incorrect work. Accept answer only.	**A1**
			(2)
(ii)	$\{\det\mathbf{Q}=\begin{vmatrix}5 & -1\\ 5 & 3\end{vmatrix}=\}\ 5\times3-5\times(-1)\ \{=20\}$	Correct value or numerical expression for det **Q** Could be seen in an attempt at $\mathbf{Q}^{-1}$	**B1**
	e.g., Area of *H* is $\frac{200}{"20"}$ $\{=10\}$ $A_H\times"20"=200$ M1: A correct ft equation or statement linking the area of *H* and 200 ignoring any incorrect expression for A_H A1: Correct statement/equation but ignore any incorrect expression for A_H		**M1** **A1**
	Area of $H=6\times\frac{1}{2}\times x\times x\sin60^\circ$ or e.g., $\frac{3\sqrt{3}}{2}x^2$ or e.g., $2\left(\frac{1}{2}x^2\sin120^\circ\right)+\sqrt{3}x.x$	Any correct expression for the area of *H* in terms of *x*. Trig expressions may be unevaluated. Not dependent.	**M1**
	$\{x=\}$ awrt 1.96	Not $\pm$. Must be decimal so A0 for e.g., $\sqrt{\frac{20\sqrt{3}}{9}}$	**A1**
	Alternative via *x*' : B1 and 2nd M1 as before $6\times\frac{1}{2}\times x'\times x'\sin60^\circ=200\Rightarrow\frac{3\sqrt{3}}{2}(x')^2=200\Rightarrow(x')^2=\frac{400}{3\sqrt{3}}$ or $\frac{400}{9}\sqrt{3}\Rightarrow x'=\sqrt{\frac{400}{3\sqrt{3}}}=\frac{20\sqrt{3}}{3}=8.7738...$ $x'=\frac{"8.7738..."}{\sqrt{20}}$ (1st M1 A1) $=1.961887...\approx1.96$ (A1)		
			(5)
			(Total 10 marks)