Question Number	Scheme	Notes	Marks
6(a)	$\mathbf{A}=\begin{pmatrix} x & 1 & 3 \\ 2 & 4 & x \\ -4 & -2 & -1 \end{pmatrix}$		
	NB: Work for (a) can only be awarded in (a)		
	$\lvert\mathbf{A}\rvert = x(-4+2x)-(-2+4x)+3(-4+16)$	Correct determinant attempt (expand by any row or column) or use the Rule of Sarrus (send to review if unsure) Sign errors allowed **only within the brackets**	M1
	$=2x^2-8x+38$	Correct simplified determinant	A1
	$2x^2-8x+38=2(x-2)^2+30$ or $\frac{\mathrm{d}}{\mathrm{d}x}(2x^2-8x+38)=4x-8=0\Rightarrow x=2$ $\Rightarrow 2x^2-8x+38=...$ or $b^2-4ac=64-4\times2\times38=...$	Starts the process of showing det $\mathbf{A}\neq 0$ E.g. Completes the square, finds the minimum point or finds discriminant May find discriminant of $x^2-4x+19=...$	M1
	$2x^2-8x+38 \geqslant 30$ or $b^2-4ac<0$ Therefore det $\mathbf{A}\neq 0$ which means $\mathbf{A}$ is non-singular	Appropriate reasoning for their chosen method and a conclusion stating that $\mathbf{A}$ is non-singular. **All 3 previous marks needed** (No need to evaluate a discriminant, so ISW slips in calculation provided $64-4\times2\times38=...$or $16-4\times19=...$ seen	A1cso
			(4)
(b)	$\begin{pmatrix} x & 1 & 3 \\ 2 & 4 & x \\ -4 & -2 & -1 \end{pmatrix}\rightarrow\begin{pmatrix} -4+2x & -2+4x & -4+16 \\ -1+6 & -x+12 & -2x+4 \\ x-12 & x^2-6 & 4x-2 \end{pmatrix}\rightarrow\begin{pmatrix} -4+2x & 2-4x & 12 \\ -5 & -x+12 & 2x-4 \\ x-12 & -x^2+6 & 4x-2 \end{pmatrix}$ M1: Applies the correct method to reach at least a matrix of cofactors 2 correct rows or 2 correct columns needed A1: Correct cofactor matrix		M1A1
	$\begin{pmatrix} -4+2x & 2-4x & 12 \\ -5 & -x+12 & 2x-4 \\ x-12 & -x^2+6 & 4x-2 \end{pmatrix}\rightarrow\begin{pmatrix} -4+2x & -5 & x-12 \\ 2-4x & -x+12 & -x^2+6 \\ 12 & 2x-4 & 4x-2 \end{pmatrix}$ $\mathbf{A}^{-1}=\frac{1}{2x^2-8x+38}\begin{pmatrix} -4+2x & -5 & x-12 \\ 2-4x & -x+12 & -x^2+6 \\ 12 & 2x-4 & 4x-2 \end{pmatrix}$ dM1: Transposes and divides by their determinant.		dM1A1

	If their original determinant has been divided by 2 (acceptable for (a)) and then used here it is **not** their determinant and so scores dM0 2 correct rows or 2 correct columns needed from their previous matrix **Depends on previous method mark**. A1: Correct matrix		
			(4)
			Total 8