Question Number	Scheme	Notes	Marks
3(a)	$\det \mathbf{A} = 5k(k-1)-(k+2)(k-3)$	Correct method for determinant. Allow one copying/bracketing or sign slip	**M1**
	$5k^2-5k-\left(k^2-k-6\right)=5$ $4k^2-4k+1=0 \Rightarrow (2k-1)^2=0 \Rightarrow k=\frac{1}{2}$	M1: Sets expression in k equal to 5, and solves a quadratic equation in k. If solving a 3TQ, usual rules apply. A1: Correct value for k	**M1** **A1**
			(3)
(b)	$\Rightarrow \mathbf{A}=\begin{pmatrix}\frac{5}{2} & -\frac{5}{2}\\ \frac{5}{2} & -\frac{1}{2}\end{pmatrix} \Rightarrow \mathbf{A}^{-1}=\frac{1}{5}\begin{pmatrix}-\frac{1}{2} & \frac{5}{2}\\ -\frac{5}{2} & \frac{5}{2}\end{pmatrix}$ $=\frac{1}{10}\begin{pmatrix}-1 & 5\\ -5 & 5\end{pmatrix}$	M1: Uses their value of k to find $\mathbf{A}$ and uses an acceptable method to find $\mathbf{A}^{-1}$. Accept any matrix that is not $\mathbf{A}$ multiplied by $\frac{1}{5}$. Condone matrix $\mathbf{A}$ not being written down, but must see any matrix that is not $\mathbf{A}$ multiplied by $\frac{1}{5}$. Alternatively finds $\mathbf{A}^{-1}$ in terms of k and then substitutes their k. Both methods require using $\det \mathbf{A} = 5$. A1: Correct inverse in required form	**M1** **A1**
	Note that in terms of k, $\mathbf{A}^{-1}=\frac{1}{4k^2-4k+6}\begin{pmatrix}k-1 & 3-k\\ -k-2 & 5k\end{pmatrix}$		
			(2)
(c)	$1.3^2\times 5 = 8.45$	8.45 or exact equivalent and no other answers given.	**B1**
			(1)
(d)	**Note:** If no working is seen, a correct answer can be given M1A1 For A1 using either method, also accept a column vector or $x=...,y=...$		
	$\frac{1}{10}\begin{pmatrix}-1 & 5\\ -5 & 5\end{pmatrix}\begin{pmatrix}-8\\ 6\end{pmatrix}=\frac{1}{10}\begin{pmatrix}8+30\\ 40+30\end{pmatrix}=\frac{1}{10}\begin{pmatrix}38\\ 70\end{pmatrix}$ $\Rightarrow \left(\frac{19}{5},\ 7\right)$	M1: Correct method to multiply their inverse and $\begin{pmatrix}-8\\ 6\end{pmatrix}$. May need to be checked if $\mathbf{A}^{-1}$ is incorrect. A1: $\left(\frac{19}{5},7\right)$ or $\left(3\frac{4}{5},7\right)$ or $(3.8,\ 7)$	**M1** **A1**
Alt	$\frac{1}{2}\begin{pmatrix}5 & -5\\ 5 & -1\end{pmatrix}\begin{pmatrix}x\\ y\end{pmatrix}=\begin{pmatrix}-8\\ 6\end{pmatrix} \Rightarrow \begin{matrix}5x-5y=-16\\ 5x-y=12\end{matrix}$ $\Rightarrow x=\frac{19}{5},\ y=7$	M1: Uses $(\text{their } \mathbf{A})\begin{pmatrix}x\\ y\end{pmatrix}=\begin{pmatrix}-8\\ 6\end{pmatrix}$ appropriately to form simultaneous equations and solves A1: $\left(\frac{19}{5},7\right)$ or $\left(3\frac{4}{5},7\right)$ or $(3.8,\ 7)$	**M1** **A1**
			(2)
			Total 8