Question	Scheme	Marks
2(a)	$\det \mathbf{A} = k\times(2\times4-3\times3)-0-0(=-k)$	**B1**
		(1)
(b)	Matrix of minors: $(\mathbf{M}) = \begin{pmatrix} 8-9 & 16-3 & 12-2 \\ 0 & 4k & 3k \\ 0 & 3k & 2k \end{pmatrix}$	**M1**
	Adj: $(\mathbf{C}^{\mathrm{T}}) = \begin{pmatrix} -1 & 0 & 0 \\ -13 & 4k & -3k \\ 10 & -3k & 2k \end{pmatrix}$	**M1**
	$\mathbf{A}^{-1} = \frac{1}{-k}\begin{pmatrix} -1 & 0 & 0 \\ -13 & 4k & -3k \\ 10 & -3k & 2k \end{pmatrix} = \frac{1}{k}\begin{pmatrix} 1 & 0 & 0 \\ 13 & -4k & 3k \\ -10 & 3k & -2k \end{pmatrix} = \begin{pmatrix} \frac{1}{k} & 0 & 0 \\ \frac{13}{k} & -4 & 3 \\ \frac{-10}{k} & 3 & -2 \end{pmatrix}$	**A1**
		(3)
(c)	$\mathbf{AB} = \mathbf{A}^{\mathrm{T}} \Rightarrow \mathbf{B} = \mathbf{A}^{-1}\mathbf{A}^{\mathrm{T}} = \begin{pmatrix} 1 & 0 & 0 \\ 13 & -4 & 3 \\ -10 & 3 & -2 \end{pmatrix}\begin{pmatrix} 1 & 4 & 1 \\ 0 & 2 & 3 \\ 0 & 3 & 4 \end{pmatrix} = \ldots$	**M1**
	$= \begin{pmatrix} 1 & 4 & 1 \\ 13 & 53 & 13 \\ -10 & -40 & -9 \end{pmatrix}$	**A1A1**
		(3)
		(7 marks)

Notes:

(a)

B1: Correct expression for the determinant. It does not need to be simplified for this mark.

(b)

M1: Attempts the matrix of minors with at least 4 correct.

M1: Applies the cofactors and takes the transpose (the determinant need not be introduced yet).

A1: Correct inverse, accept with the determinant outside or inside. (Any expression in the scheme is acceptable.)

(c)

M1: Correctly multiplies across by $\mathbf{A}^{-1}$, applies the transpose and multiplies.

A1: At least 5 correct entries

A1: Fully correct answer.

Alt

M1: Attempts $\mathbf{AB} = \mathbf{A}^{\mathrm{T}}$ after applying the transpose, multiplies the LHS and equates elements

A1: At least 5 correct elements

A1: All elements correct