1(a)	$\begin{pmatrix} 5 \\ -9 \end{pmatrix}$	**2**	**B1** for one correct element
1(b)	$(-3 \ -3 \ \ 7)$	**2**	**M1** for any 1×3 matrix If 0 scored, **SC1** for $\begin{pmatrix} -3 \\ -3 \\ 7 \end{pmatrix}$
2(a)	$\begin{pmatrix} -1 & 0 \\ 3 & 1 \end{pmatrix}$	**2**	**B1** for 2 or 3 correct elements in final answer or $\begin{pmatrix} -3 & 0 \\ 9 & 3 \end{pmatrix}$ soi or $\begin{pmatrix} 3 & 0 \\ -9 & -3 \end{pmatrix}$ soi
2(b)	$\frac{1}{2}\begin{pmatrix} -3 & 2 \\ -4 & 2 \end{pmatrix}$ or $\begin{pmatrix} -1.5 & 1 \\ -2 & 1 \end{pmatrix}$	**3**	**B2** for $p = -3$ OR **M1** for $2p - (4 \times -2) = 2$ oe **B1** for $\frac{1}{2}\begin{pmatrix} \textit{their } p & 2 \\ -4 & 2 \end{pmatrix}$ oe
3(a)	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	**2**	**B1** for two or three correct elements
3(b)	$(-6 \ \ -4)$	**2**	**M1** for $[\mathbf{X} =]\begin{pmatrix} 0 & 2 \end{pmatrix}\begin{pmatrix} 2 & 1 \\ -3 & -2 \end{pmatrix}$ or for using $\mathbf{X} = (a \ \ b)$ to get as far as $(2a - 3b \quad a - 2b)$ $[= (0 \quad 2)]$
4	$\frac{1}{8}\begin{pmatrix} 2 & 2 \\ -1 & 3 \end{pmatrix}$ oe or $\begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ -\frac{1}{8} & \frac{3}{8} \end{pmatrix}$ oe	**2**	**B1** for $[k]\begin{pmatrix} 2 & 2 \\ -1 & 3 \end{pmatrix}$ oe or for $\frac{1}{8}\begin{pmatrix} \cdot & \cdot \\ \cdot & \cdot \end{pmatrix}$ oe
5(a)	$\begin{pmatrix} 5 & 4 \\ 7 & 9 \end{pmatrix}$	**1**	
5(b)(i)	$\begin{pmatrix} 175 \\ 347 \end{pmatrix}$	**2**	**B1** for $\begin{pmatrix} 175 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 347 \end{pmatrix}$ or 175 **and** 347 seen in final answer
5(b)(ii)	Total cost of Adam's tickets and total cost of Ben's tickets	**1**	

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6(a)(i)	$\begin{pmatrix}140\\145\end{pmatrix}$	**2**	**B1** for one element correct in a 2 by 1 matrix If 0 scored, **SC1** for answer (140 145)
6(a)(ii)	Total money for tickets on Monday and total money for tickets on Tuesday	**1**	
6(b)	$\begin{pmatrix}2.75\\2.20\end{pmatrix}$	**2**	**B1** for one element correct or for 2.75 oe and 2.20 oe seen If 0 scored, **SC2** for answer $\begin{pmatrix}154\\159.5\end{pmatrix}$ or $\begin{pmatrix}1.1\times their 140\\1.1\times their 145\end{pmatrix}$ evaluated or **SC1** for one element correct
7(a)	$\begin{pmatrix}9 & -4\\-6 & -5\end{pmatrix}$	**2**	**B1** for two or three correct elements
7(b)	–2	**1**	
7(c)	$-\frac{1}{2}\begin{pmatrix}-1 & 0\\3 & 2\end{pmatrix}$ oe	**1**	**FT** $\frac{1}{their-2}\begin{pmatrix}-1 & 0\\3 & 2\end{pmatrix}$
7(d)	$(5 \quad 2)$	**2**	**B1** for one correct element in 1 by 2 matrix or **M1** for $\mathbf{X}=(4 \quad -2)\mathbf{A}^{-1}$ oe or for $(2x-3y \quad -y)=(4 \quad -2)$ oe If 0 scored, **SC1** for answer $\begin{pmatrix}5\\2\end{pmatrix}$
8(a)	$\begin{pmatrix}5 & -5\\-4 & 4\end{pmatrix}$	**2**	**B1** for two or three correct elements
8(b)	$\begin{pmatrix}2 & -2\\0 & 1\end{pmatrix}$ oe isw or $2\begin{pmatrix}1 & -1\\0 & \frac{1}{2}\end{pmatrix}$ oe isw	**2**	**B1** for $k\begin{pmatrix}1 & -1\\0 & \frac{1}{2}\end{pmatrix}$ oe with $k\neq 2$ or 0 or for $2\begin{pmatrix}. & .\\. & .\end{pmatrix}$ oe
8(c)	$\begin{pmatrix}2\\-1\end{pmatrix}$	**2**	**M1** for using **X** is a 2 by 1 matrix If 0 scored, **SC1** for a final answer of (2 –1)

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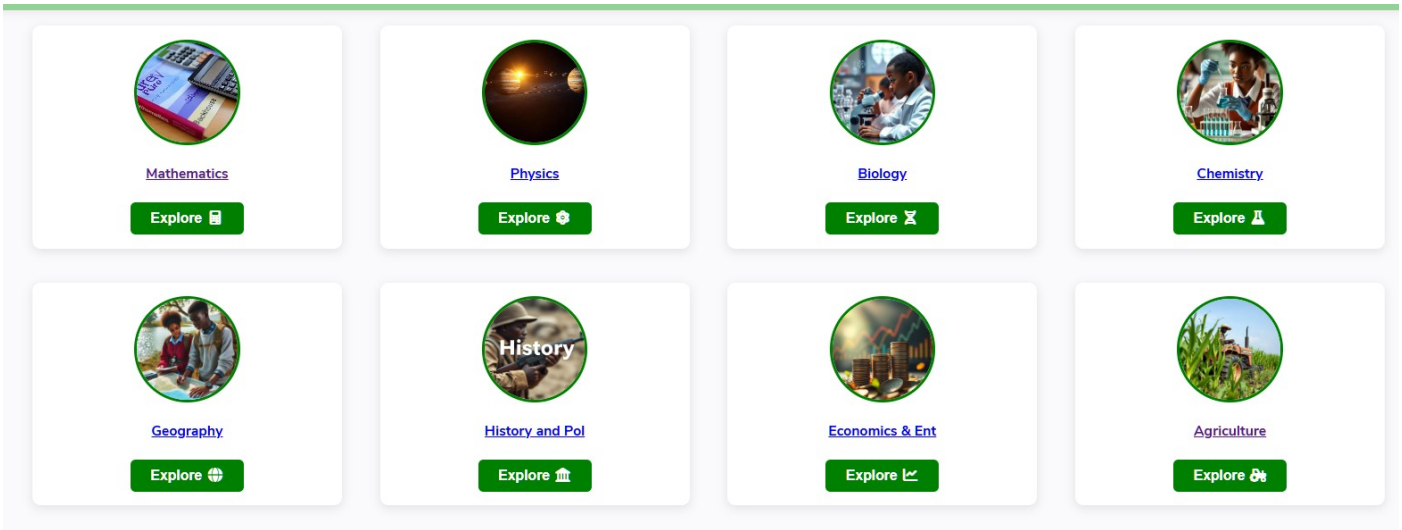
9(a)	$\begin{pmatrix} 4 & 8 \\ -2 & -7 \end{pmatrix}$	**2**	**B1** for two or three correct elements
9(b)(i)	–2	**1**	
9(b)(ii)	$-\frac{1}{4}\begin{pmatrix} -2 & 1 \\ -2 & 3 \end{pmatrix}$ oe isw or $\begin{pmatrix} \frac{1}{2} & -\frac{1}{4} \\ \frac{1}{2} & -\frac{3}{4} \end{pmatrix}$ oe isw	**1**	**FT** $-\frac{1}{4}\begin{pmatrix} their\,k & 1 \\ -2 & 3 \end{pmatrix}$
10(a)	$\begin{pmatrix} -2 & -1 \\ -4 & -2 \end{pmatrix}$	**2**	**B1** for two or three correct elements or **M1** for $\begin{pmatrix} 6 & -3 \\ 0 & -2 \end{pmatrix} - 2\begin{pmatrix} 4 & -1 \\ 2 & 0 \end{pmatrix}$ oe or **SC1** for answer $\begin{pmatrix} 2 & 1 \\ 4 & 2 \end{pmatrix}$
10(b)	$\frac{1}{2}\begin{pmatrix} 0 & 1 \\ -2 & 4 \end{pmatrix}$ or $\begin{pmatrix} 0 & \frac{1}{2} \\ -1 & 2 \end{pmatrix}$ oe	**3**	**B2** for $k\begin{pmatrix} 0 & 1 \\ -2 & 4 \end{pmatrix}$ oe with $k \neq \frac{1}{2}$ or for $\frac{1}{2}\begin{pmatrix} . & . \\ . & . \end{pmatrix}$ oe or for 3 or 4 correct elements in $\begin{pmatrix} 0 & \frac{1}{2} \\ -1 & 2 \end{pmatrix}$ seen or **M1** for $\mathbf{Y} = \mathbf{A}^{-1}$; or for $\mathbf{Y} = \mathbf{A}^{-1}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ or for determinant of $\mathbf{A} = 2$ or **B1** for $\begin{pmatrix} 4 & -1 \\ 2 & 0 \end{pmatrix}\begin{pmatrix} a & b \\ c & d \end{pmatrix} = \begin{pmatrix} 4a-c & 4b-d \\ 2a & 2b \end{pmatrix}$
11(a)	(6) nfww	**2**	**B1** for 76 seen or for 70 seen or **M1** for $(30\times1.2+20\times2)-(40\times-0.5+30\times3)$ oe
11(b)	Difference in profit between Week 1 and Week 2 oe	**1**	
12(a)	$\begin{pmatrix} 1 & 0 \\ 8 & 8 \end{pmatrix}$	**2**	**B1** for 2 or 3 elements correct
12(b)	$\begin{pmatrix} -7 \\ 5 \end{pmatrix}$	**2**	**B1** for $\begin{pmatrix} -7 \\ 5 \end{pmatrix}$ or $\begin{matrix} -7 \\ 5 \end{matrix}$ or $\begin{pmatrix} -7 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 5 \end{pmatrix}$ or (–7 [,] 5)
12(c)	$\begin{pmatrix} 2 & 1 \\ -2 & -\frac{1}{2} \end{pmatrix}$ or $\frac{1}{2}\begin{pmatrix} 4 & 2 \\ -4 & -1 \end{pmatrix}$ oe isw	**3**	**B2** for $\frac{1}{2}\begin{pmatrix} -2 & -2 \\ 4 & 3 \end{pmatrix}$ oe or **B1** for determinant = 2 soi or $k\begin{pmatrix} -2 & -2 \\ 4 & 3 \end{pmatrix}$

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13	**(a)**	$\frac{1}{7}$	**1**	
	(b)	$\begin{pmatrix} -1 & -4 \\ 2 & 0 \end{pmatrix}$	**2**	**C1** for 2 or 3 correct elements.
	(c)	(2 0), or (14 × *their* (a) 0) ft	**2**	M1 for (**Y** =) (6 2) $\mathbf{A}^{-1}$ seen. If (x y) **A** = (6 2) is used, then award **M1** at the stage where an attempt to solve the simultaneous eqns. is made.
14	**(a)**	$\begin{pmatrix} 6 \\ 7 \\ 15 \end{pmatrix}$	**2**	**B1** for 2 correct entries or for $\begin{pmatrix} 10 \\ -5 \\ 15 \end{pmatrix}$ or $\begin{pmatrix} 4 \\ -12 \\ 0 \end{pmatrix}$ soi
	(b)	$\begin{pmatrix} 13 \\ 10 \end{pmatrix}$	**2**	**B1** for one entry correct or for both 13 and 10 seen but not in this form.
	(c)	**(i)** $\frac{1}{4}\begin{pmatrix} 4 & 0 \\ 2 & 1 \end{pmatrix}$ oe isw	**2**	**B1** for det $\begin{pmatrix} 1 & 0 \\ -2 & 4 \end{pmatrix} = 4$ soi or $\begin{pmatrix} 4 & 0 \\ 2 & 1 \end{pmatrix}$
		(ii) $\begin{pmatrix} -2 & 0 \\ -2 & 1 \end{pmatrix}$	**2**	**B1** for three entries correct or $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ soi
15	**(a)**	$\begin{pmatrix} 5 \\ -10 \end{pmatrix}$ oe	1	
	(b)	(s =) 5 (t =) 2	2	**C1** for one correct or **M1** for $\begin{pmatrix} 3s \\ -2s \end{pmatrix} + \begin{pmatrix} -3 \\ 12 \end{pmatrix} = \begin{pmatrix} 12 \\ t \end{pmatrix}$ oe

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