Matrices 2 IGCSE Answers

1)	**(a)** $\begin{pmatrix} -14 & 0 \\ 0 & -14 \end{pmatrix}$	2	**B1** two or three correct answers
	(b) –14	1	
	(c) $\begin{pmatrix} -5 & 4 \\ 5 & -4 \end{pmatrix}$	2	**B1** two or three terms correct
2)	**(a) (i)** $\begin{pmatrix} 25 \\ 43 \end{pmatrix}$	1 1	If 0, 0 then **SC1** for 25 and 43 seen
	(ii) (16)	2	**B1** for 16 without brackets
	(iii) $\frac{1}{-2}\begin{pmatrix} 5 & -3 \\ -4 & 2 \end{pmatrix}$ isw or $\begin{pmatrix} -\frac{5}{2} & \frac{3}{2} \\ 2 & -1 \end{pmatrix}$	2	**B1** for determinant = –2 or **B1** for $k\begin{pmatrix} 5 & -3 \\ -4 & 2 \end{pmatrix}$
	(b) Reflection only	1	If more than one transformation given – no marks available
	x-axis oe	1	independent
	(c) $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$	2	**B1** for one correct column
3)	**(a)** $\begin{pmatrix} 8 & 5 \\ 20 & 13 \end{pmatrix}$	**2**	**B1** two or three entries correct
	(b) $\begin{pmatrix} 1\frac{1}{2} & -\frac{1}{2} \\ -2 & 1 \end{pmatrix}$ oe	**2**	**B1** $\frac{1}{2}\begin{pmatrix} a & c \\ b & d \end{pmatrix}$ **B1** $(k)\begin{pmatrix} 3 & -1 \\ -4 & 2 \end{pmatrix}$
4)	**(a) (i)** 2 × 2	**1**	
	(ii) (20)	**1**	Brackets essential
	(b) $\frac{1}{2}\begin{pmatrix} 4 & -3 \\ -2 & 2 \end{pmatrix}$ oe	**2**	**M1** for $\frac{1}{2}\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ or $k\begin{pmatrix} 4 & -3 \\ -2 & 2 \end{pmatrix}$ seen
5)	**(a)** $\begin{pmatrix} 17 & -32 \\ 16 & 1 \end{pmatrix}$	**2**	**M1** any 2 entries correct
	(b) $\begin{pmatrix} 10 & -8 \\ 4 & 6 \end{pmatrix}$	**1**	
	(c) 23 cao	**1**	
	(d) $\frac{1}{23}\begin{pmatrix} 3 & 4 \\ -2 & 5 \end{pmatrix}$	**2**	**M1** $\begin{pmatrix} 3 & 4 \\ -2 & 5 \end{pmatrix}$ or $\frac{1}{}$ **(c)** $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ seen

6)	trapezium at (–2, –1),(–4, –1), (–4, –2), (–3, –2) **www**	**5**	**SC4** for correct co-ordinates or vectors or matrix seen with no diagram or with an incorrect diagram. **SC3** for correct diagram with wrong working or one other incorrect trapezium which is not part of a correct method. If 0 then **B2** for $\begin{pmatrix}-1 & 0\\ 0 & -1\end{pmatrix}$ or **M1ft** "BA" $\begin{pmatrix}2 & 4 & 4 & 3\\ 1 & 1 & 2 & 2\end{pmatrix} = \begin{pmatrix}-2 & -4 & -4 & -3\\ -1 & -1 & -2 & -2\end{pmatrix}$ **A1ft**
7)	**(a)** $\frac{1}{5}\begin{pmatrix}1 & -2\\ 1 & 3\end{pmatrix}$	**2**	**B1** for $\frac{1}{5}\begin{pmatrix}a & b\\ c & d\end{pmatrix}$ or $k\begin{pmatrix}1 & -2\\ 1 & 3\end{pmatrix}$ seen
	(b)(i) **D** cao	**1**	
	(ii) $\mathbf{D}^{-1}\mathbf{E}$ cao	**1**	
8)	**(a)** **(i)** $\begin{pmatrix}-2\\ -1\end{pmatrix}$	**1**	
	(ii) 7.28 [0] or $\pm\sqrt{53}$ as final answer	**2**	**M1** for $\sqrt{2^2 + (-7^2)}$ oe
	(iii) [m =] 3.5 oe and [n =] –1.5 oe	**6**	**B1** for $-2m + 2n = -10$ oe and **B1** for $3m - 7n = 21$ oe and **M1** for correct attempt to equate one set of coefficients and **M1dep** for elimination allow 1 arithmetic error overall ft their sim eqns for both m's or **M1** for correct rearrangement (allow 1 slip) and **M1dep** for correct substitution ft their sim eqns for both m's and **A1** for 3.5 or –1.5