1 $\mathbf{A} = \begin{array}{c} \begin{matrix} a & b \end{matrix} \\ \begin{pmatrix} 3 & 2 \\ -1 & 1 \end{pmatrix} \\ \begin{matrix} c & d \end{matrix} \end{array}$ $\mathbf{B} = (-2 \quad 5)$ $\mathbf{C} = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$ $\mathbf{D} = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$

(a) Work out, when possible, each of the following.
If it is not possible, write 'not possible' in the answer space.

(i) 2**A**

$$2\begin{pmatrix} 3 & 2 \\ -1 & 1 \end{pmatrix} = \begin{pmatrix} 6 & 4 \\ -2 & 2 \end{pmatrix}$$

Answer(a)(i) $\begin{pmatrix} 6 & 4 \\ -2 & 2 \end{pmatrix}$ [1]

(ii) **B** + **C**

$$(-2 \quad 5) + \begin{pmatrix} -2 \\ 5 \end{pmatrix}$$

Answer(a)(ii) Not Possible [1]

(iii) **AD**

$$\begin{pmatrix} 3 & 2 \\ -1 & 1 \end{pmatrix}\begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix} = \begin{pmatrix} 3\cdot 2 + 2\cdot 0 & 3\cdot 0 + 2\cdot 2 \\ -1\cdot 2 + 1\cdot 0 & -1\cdot 0 + 1\cdot 2 \end{pmatrix}$$

$$= \begin{pmatrix} 6+0 & 0+4 \\ -2+0 & 0+2 \end{pmatrix}$$

$$= \begin{pmatrix} 6 & 4 \\ -2 & 2 \end{pmatrix}$$

Answer(a)(iii) $\begin{pmatrix} 6 & 4 \\ -2 & 2 \end{pmatrix}$ [2]

(iv) $\mathbf{A}^{-1}$, the inverse of **A**.

$$A^{-1} = \frac{1}{a\cdot d - b\cdot c}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$$

$$= \frac{1}{3\cdot 1 - 2(-1)}\begin{pmatrix} 1 & -2 \\ 1 & 3 \end{pmatrix}$$

$$= \frac{1}{3+2}\begin{pmatrix} 1 & -2 \\ 1 & 3 \end{pmatrix}$$

$$= \frac{1}{5}\begin{pmatrix} 1 & -2 \\ 1 & 3 \end{pmatrix}$$

Answer(a)(iv) $\frac{1}{5}\begin{pmatrix} 1 & -2 \\ 1 & 3 \end{pmatrix}$ [2]

(b) Explain why it is not possible to work out **CD**.

Answer(b) 1 column in C and 2 rows in D [1]

(c) Describe fully the **single** transformation represented by the matrix **D**.

Answer(c) Enlargement scale factor 2 centre (0,0)

[3]