| Question Number | Scheme | Notes | Marks |
|---|---|---|---|
| **3(a)** | $\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}\begin{pmatrix} 2 & 2 & 0 \\ 1 & 3 & 1 \end{pmatrix} = \begin{pmatrix} 1 & 3 & 1 \\ -2 & -2 & 0 \end{pmatrix}$ | Attempt to multiply in the correct order with at least four correct elements.<br>May be done as three separate calculations, so look for at least 4 correct values. | M1 |
| | (1,−2), (3,−2) and (1,0) | Accept as individual column vectors but not as a single 2x3 matrix. | A1 |
| | | | (2) |
| **3(b)** | Rotation | Accept rotate or turn oe. | B1 |
| | **270°** (anticlockwise) **about the origin** | Accept −90° (anticlockwise) or 90° clockwise (must be stated) and (0,0) or *O*.<br>*Assume anticlockwise unless otherwise stated.* | B1 |
| | | | (2) |
| | | | |
| **3(c)** | $\mathbf{Q} = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}, \mathbf{R} = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$ | One correct, both correct | B1,B1 |
| | | | (2) |
| **3(d)** | $\mathbf{RQ} = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$ | Multiplication in correct order for their matrices and at least 1 row or 1 column correct. | M1 |
| | $= \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$ | Correct matrix | A1 |
| | | | (2) |
| **3(e)** | Reflection | Correct type identified. | B1 |
| | in (the line) $y = x$ | Correct line of reflection specified, accepting equivalent forms (e.g. line at angle 45° (anticlockwise) to the (positive) *x*-axis). | B1 |
| | | | (2) |
| | | | **Total 10** |