| Topic | What students need to learn: |  |
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|  | Content | Guidance |


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| 3 <br> Matrices <br> continued | 3.3 | Use matrices to represent linear transformations in 2-D. <br> Successive transformations. <br> Single transformations in 3-D. | For 2-D, identification and use of the matrix representation of single and combined transformations from: reflection in coordinate axes and lines $y= \pm x$, rotation through any angle about $(0,0)$, stretches parallel to the $x$-axis and $y$-axis, and enlargement about centre $(0,0)$, with scale factor $k,(k \neq 0)$, where $k \in \mathbb{R}$. <br> Knowledge that the transformation represented by AB is the transformation represented by $B$ followed by the transformation represented by $\mathbf{A}$. <br> 3-D transformations confined to reflection in one of $x=0, y=0, z=0$ or rotation about one of the coordinate axes. <br> Knowledge of 3-D vectors is assumed. |
|  | 3.4 | Find invariant points and lines for a linear transformation. | For a given transformation, students should be able to find the coordinates of invariant points and the equations of invariant lines. |
|  | 3.5 | Calculate determinants of $2 \times 2$ and $3 \times 3$ matrices and interpret as scale factors, including the effect on orientation. | Idea of the determinant as an area scale factor in transformations. |
|  | 3.6 | Understand and use singular and non-singular matrices. <br> Properties of inverse matrices. <br> Calculate and use the inverse of non-singular $2 \times 2$ matrices and $3 \times 3$ matrices. | Understanding the process of finding the inverse of a matrix is required. <br> Students should be able to use a calculator to calculate the inverse of a matrix. |


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| Continued | 3.7 | Solve three linear <br> simultaneous <br> equations in three <br> variables by use <br> of the inverse <br> matrix. | Guidance |

