Topics	What students need to learn:		
	Content		Guidance
2 **Complex numbers** *continued*	2.4	Use and interpret Argand diagrams.	Students should be able to represent the sum or difference of two complex numbers on an Argand diagram.
	2.5	Convert between the Cartesian form and the modulus-argument form of a complex number. Knowledge of radians is assumed.	
	2.6	Multiply and divide complex numbers in modulus argument form. Knowledge of radians and compound angle formulae is assumed.	Knowledge of the results, $\lvert z_1 z_2 \rvert = \lvert z_1 \rvert \lvert z_2 \rvert$, $\left\lvert \frac{z_1}{z_2} \right\rvert = \frac{\lvert z_1 \rvert}{\lvert z_2 \rvert}$ $\arg(z_1 z_2) = \arg z_1 + \arg z_2$ $\arg\left(\frac{z_1}{z_2}\right) = \arg z_1 - \arg z_2$
	2.7	Construct and interpret simple loci in the argand diagram such as $\lvert z-a \rvert > r$ and $\arg(z-a) = \theta$ Knowledge of radians is assumed.	To include loci such as $\lvert z-a \rvert = b$, $\lvert z-a \rvert = \lvert z-b \rvert$, $\arg(z-a) = \beta$, and regions such as $\lvert z-a \rvert \leqslant \lvert z-b \rvert$, $\lvert z-a \rvert \leqslant b$, $\alpha < \arg(z-a) < \beta$
3 **Matrices**	3.1	Add, subtract and multiply conformable matrices. Multiply a matrix by a scalar.	
	3.2	Understand and use zero and identity matrices.	
	3.3	Use matrices to represent linear transformations in 2-D. Successive transformations. 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 $k \in \mathbb{R}$. Knowledge that the transformation represented by $\mathbf{AB}$ is the transformation represented by $\mathbf{B}$ followed by the transformation represented by $\mathbf{A}$. 3-D transformations confined to reflection in one of $x = 0, y = 0, z = 0$ or rotation about one of the coordinate axes. Knowledge of 3-D vectors is assumed.

Topics	What students need to learn:		
	Content		Guidance
3 **Matrices** *continued*	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: 2×2 and 3×3 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. Properties of inverse matrices. Calculate and use the inverse of non-singular 2×2 matrices and 3×3 matrices.	Understanding the process of finding the inverse of a matrix is required. Students should be able to use a calculator to calculate the inverse of a matrix.
	3.7	Solve three linear simultaneous equations in three variables by use of the inverse matrix.	
	3.8	Interpret geometrically the solution and failure of solution of three simultaneous linear equations.	Students should be aware of the different possible geometrical configurations of three planes, including cases where the planes: (i) meet in a point (ii) form a sheaf (iii) form a prism or are otherwise inconsistent
4 **Further algebra and functions**	4.1	Understand and use the relationship between roots and coefficients of polynomial equations up to quartic equations.	For example, given a cubic polynomial equation with roots α, β and γ students should be able to evaluate expressions such as (i) $\alpha^2 + \beta^2 + \gamma^2$ (ii) $\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma}$ (iii) $(3 + \alpha)(3 + \beta)(3 + \gamma)$ (iv) $\alpha^3 + \beta^3 + \gamma^3$