

Contents

<i>Getting the most from this book</i>	iv	5 Complex numbers and geometry	97
<i>Prior knowledge</i>	vi	5.1 The modulus and argument of complex number	98
1 Matrices and transformations	1	5.2 Multiplying and dividing complex numbers in modulus-argument form	106
1.1 Matrices	2	5.3 Loci in the Argand diagram	110
1.2 Multiplication of matrices	6	6 Matrices and their inverses	124
1.3 Transformations	13	6.1 The determinant of a matrix	125
1.4 Successive transformations	27	6.2 The inverse of a matrix	131
1.5 Invariance	33	6.3 Using matrices to solve simultaneous equations	137
2 Introduction to complex numbers	39	7 Vectors and 3D space	143
2.1 Extending the number system	40	7.1 Finding the angle between two vectors	143
2.2 Division of complex numbers	44	7.2 The equation of a plane	150
2.3 Representing complex numbers geometrically	47	7.3 Intersection of planes	157
3 Roots of polynomials	52	Practice Questions Further Mathematics 2	167
3.1 Polynomials	53	An introduction to radians	169
3.2 Cubic equations	58	The identities $\sin(\theta \pm \phi)$ and $\cos(\theta \pm \phi)$	172
3.3 Quadratic equations	62	<i>Answers</i>	174
3.4 Solving polynomial equations with complex roots	65	<i>Index</i>	213
4 Sequences and series	71		
4.1 Sequences and series	72		
4.2 Using standard results	77		
4.3 The method of differences	80		
4.4 Proof by induction	85		
4.5 Other proofs by induction	90		
Practice Questions Further Mathematics 1	95		