

Contents

1. Numbers

Real Numbers (10A)	9
Whole Numbers	11
Roman Numerals	13
Fractions	14
Decimal Numbers	21
Integers (Directed Numbers)	28
Problem Solving	31
Problem Solving	33
Puzzles	34
Chapter Review	35

2. Percentages

Percentages	38
Percentages, Fractions and Decimals	39
Finding Percentages	41
Percentage of Quantities	43
Finding 100%	48
Simple Interest	49
Compound Interest	50
Percentage Errors	54
Problem Solving	56
Puzzles	58
Chapter Review	59

3. Surds (10A)

Rational and Irrational Numbers	61
Simplifying Surds	62
Surds and the Distributive Law	68
Rationalising the Denominator	70
Problem Solving	75
Puzzle	75
Chapter Review	76

4. Indices

Indices	77
Index Laws	79
Using All The Index Laws	84
Fractional Indices (10A) ...	87
Index Laws and Fractional Indices (10A) ..	90
Scientific Notation (Standard Form)	92
Exponential Growth and Decay	95
Problem Solving	101
Puzzles	101
Chapter Review	102

5. Logarithms (10A)

Logarithms	103
Evaluating Logarithms	105
Logarithm Laws	106
Using All The Logarithm Laws	111
Logarithms with Base 10 ..	117
The Richter Scale	122
Decibels	126
pH	130
Problem Solving	132
Puzzle	132
Chapter Review	133

6. Algebra

Algebraic Symbols	134
Expanding Algebraic Expressions	138
Factorisation	144
Factorising by Grouping ..	146
Factorising the Difference of Perfect Squares (DOPS)	148
Factorising Quadratic Trinomials with $a = 1$	151
Factorising Quadratic Trinomials with $a \neq 1$	153
Perfect Squares	155
Completing the Square	156
Algebraic Fractions	158
Creating Formulae	164
Transposition	165
Substitution	167
Problem Solving	170
Puzzle	170
Chapter Review	171

7. Solving Equations

Solving Linear Equations ..	173
Solving Quadratic Equations	182
The Quadratic Formula	185
Worded Problems	188
Inequalities	190
Worded Problems	194
Problem Solving	198
Puzzle	198
Chapter Review	199

8. Polynomials (10A)

Polynomials	201
Factorising Polynomials ...	204
Solving Polynomial Equations	221
Sketching Polynomials	224
The Remainder Theorem ..	232
Problem Solving	234
Puzzle	234
Chapter Review	235

9. Linear Relationships

Linear Relationships	236
Gradient	239
Calculating Gradient	242
x - and y -Intercepts	244
$y = mx + c$	247
Perpendicular Lines	250
Finding Equations of Straight Lines	254
Simultaneous Equations ...	259
Problem Solving Using Simultaneous Equations ..	269
Problem Solving	271
Puzzle	271
Chapter Review	272

10. Non-linear Relationships

Parabolas	274
Sketching Parabolas	278
Finding x - and y -Intercepts	280
Finding the Turning Point Using the Axis of Symmetry	283
Finding the Turning Point Using $y = a(x - h)^2 + k$...	284
Turning Point Form	286
Practical Applications	287
Rectangular Hyperbolas ...	291
Transforming Hyperbolas ..	298
Circles	305
Exponentials	309
Problem Solving	313
Puzzle	313
Chapter Review	314

11. Measurement

Length	318
Perimeter	322
Area - Conversions	329
Area - Shapes	330
Area - Composite Shapes ..	334
Hero's Formula (Heron's Formula) (10A)	336
Area - Problem Solving ...	337
Surface Area	338
Volume	347
Volume of Regular Objects	349
Problem Solving	356
Puzzle	356
Chapter Review	357

12. Pythagoras

Pythagoras' Theorem	363
Finding the Hypotenuse ...	363
Finding One of the Shorter Sides	366
Mixed Problems	368
Practical Problems	369
Pythagoras in 3D (10A) ...	370
Problem Solving	371
Puzzle	371
Chapter Review	371

13. Geometry

Angles	372
Triangles and Quadrilaterals	373
Parts of Circles	377
Angles in Circles (10A) ...	379
Similar Triangles	386
Congruent Triangles	396
Problem Solving	399
Puzzle	400
Chapter Review	401

14. Trigonometry

Degrees, Minutes and Seconds	409
Radians	411
Trigonometric Functions ..	413
SOHCAHTOA	414
Finding Side Lengths	418
Applications	422
Calculating Angles	424
Applications	427
The Unit Circle (10A)	430
Trigonometric Identities (10A)	442
The Sine Rule (10A)	444
The Cosine Rule (10A)	455
Mixed Problems (10A)	464
Problem Solving	466
Puzzle	466
Chapter Review	467

15. Probability

Probability	470
Predicting Outcomes	476
Listing Possible Outcomes for Multiple Events	478
Venn Diagrams	485
Karnaugh Maps	488
$P(A \text{ or } B)$	491
$P(A \text{ and } B)$ - Independent Events	496
$P(A \text{ and } B)$ - Dependent Events	499
Multiple Events	501
Problem Solving	504
Puzzle	504
Chapter Review	505

16. Data

Data	507
Collecting Data	508
Samples and Population ..	510
Types of Data	513
Presenting Data	514
Bivariate Data	518
Mean, Mode and Median - Discrete Ungrouped Data	521
Mean, Mode and Median - Discrete Grouped Data	524
Mean, Mode and Median - Continuous Data	527
Stemplots (Stem-and-Leaf Plots)	534
Boxplots (Box-and-Whisker Plots).	536
Outliers	538
Normal Distribution and Standard Deviation (10A).	541
Calculating Standard Deviation (10A)	550
Problem Solving	556
Puzzle	556
Chapter Review	557

Answers	559
----------------------	-----