Y12 Further Mathematics
Revision List for End of Year Exams

Pure Year 1/AS			
Chapter 1	Basic algebraic manipulation, indices and surds	Laws of indices	Pg 2 Ex 1A, Pg 9 Ex 1D
		Expanding brackets, collecting like terms, factorising	Pg 4 Ex 1B, Pg 6 Ex 1C
		Surds	Pg 12 Ex 1E, Pg 13 Ex 1F
Chapter 2	Quadratic Functions	Solving quadratic equations by factorising, quadratic formula	Pg 19 Ex 2A, Pg 20 Ex 2B
		Complete the square	Pg 22 Ex 2C, Pg 24 Ex 2D
		Function notation	Pg 25 Ex 2E
		Quadratic graphs	Pg 27 Ex 2F
Chapter 3	Equations & Inequalities	Linear simultaneous equations	Pg 39 Ex 3A
		Quadratic simultaneous equations	Pg 41 Ex 3B
		Solving simultaneous equations graphically	Pg 42 Ex 3C
		Linear Inequalities	Pg 46 Ex 3D
Chapter 5	Straight Line Graphs	Using the equations of straight line	Pg 90 Ex 5A, Pg 91 Ex 5B, Pg 93 Ex 5C
		Parallel and perpendicular lines	Pg 97 Ex 5E, Pg 98 Ex 5F
		Length and area	Pg 100 Ex 5G
		Modelling with straight lines	Pg 103 Ex 5H
Chapter 9	Trigonometry	Cosine rule	Pg 174 Ex 9A

		Sine rule	Pg 179 Ex 9B
		Ambiguous case	Pg 183 Ex 9C
		Area of a triangle	Pg 185 Ex 9D
Chapter 2, 3	Quadratic Functions Equations & Inequalities (prep for circles)	The discriminant	Pg 30 Ex 2G
		Modelling with discriminants	Pg 32 Ex 2H
		Simultaneous Equation recap	Pg 41 Ex 3B
		Quadratic inequalities	Pg 48 Ex 3E
		Solving inequalities graphically	Pg 51 Ex 3F, Pg 53 Ex 3G
		Straight line recap	Pg 90 Ex 5A, Pg91 Ex5B, Pg 93 Ex 5C
Chapter 4	Graphs and transformations	Cubic, quartic and reciprocal graphs	Pg 60 Ex 4A, Pg 64 Ex 4B, Pg66 Ex 4C
		Points of intersection	Pg 68 Ex 4D
		Transforming graphs (translate, stretch, reflect)	Pg 71 Ex 4E, Pg 75 Ex 4F
		Transforming functions	Pg 79 Ex 4G
Chapter 6	Circles	Midpoints and perpendicular bisectors	Pg 114 Ex 6A, Pg 116 Ex 6B
		Equation of a circle	Pg 117 Ex 6c
		Intersection of lines and circles	Pg 121 Ex 6D
		Tangents and chords	Pg 123 Ex 6E
		Circles and triangle	Pg 128 Ex 6F
Chapter 7	Algebraic methods	Algebraic fractions	Pg 138 Ex 7A
		Polynomial division	Pg 139 Ex 7B
		Factor theorem	Pg 143 Ex 7C
		Proof	Pg 146 Ex 7D, Pg 150 Ex 7E
Chapter 8	Binomial theorem	Pascal's triangle	Pg 159 Ex 8A
		Factorial notation	Pg 161 Ex 8B
		Using the binomial theorem	Pg 163 Ex 8C, Pg165 Ex 8D, pg 167 Ex 8D

Chapter 9	Trigonometric ratios	Cosine rule recap	Pg 174 Ex 9A
		Sine rule recap	Pg 179 Ex 9B
		Ambiguous case recap	Pg 183 Ex 9C
		Area of a triangle recap	Pg 185 Ex 9D
		Problem solving using trigonometry	Pg 187 Ex 9E
		Trigonometric graphs and graph transformations	Pg 192 Ex 9F, Pg194 Ex 9G
A2 Chapter 5	A2**Radians (Introduction)	Radian measure	Pg 114 Ex5A, Pg 117 Ex5B
		Arc Length	Pg 118 Ex5C
		Areas of sectors and segments	Pg 122 Ex5D
		Solving trigonometric equations using radians	Pg 128 Ex5E
Chapter 10	Trig identities and Equations	Angles in all 4 quadrants and trig ratios	Pg 203 Ex 10A, Pg 208 Ex 10B
		Using identities	Pg 209 Ex 10c
		Solving equations	Pg 213 Ex 10D, Pg 217 Ex 10E
		Using identities to solve equations	Pg 219 Ex 10F
Chapter 12	Differentiation	Gradients of chords and differentiation by first principles	Pg 256 Ex 12A, Pg 259 Ex 12B
		Differentiation of functions	Pg 262 Ex 12C, Pg 264 Ex 12D, Pg 266 Ex 12E
		Gradients of tangents and normals	Pg 268 Ex 12F
		Increasing and decreasing functions	Pg 270 Ex 12G
		Second order differentials and stationary points	Pg 271 Ex 12H, Pg 273 Ex 12I
		Sketching gradient functions	Pg 277 Ex 12J
		Modelling with differentiation	Pg 279 Ex 12K
Chapter 11	Vectors	Properties of vectors	Pg 231 Ex 11A
		Representing vectors	Pg 235 Ex 11B

		Magnitude and direction	Pg 238 Ex 11C
		Position vectors	Pg 242 Ex 11D
		Solving vector problems	Pg 244 Ex 11E, Pg 248 Ex 7F
A2 Chapter 12	A2** Vectors	3D Co-ordinates and 3D vectors	Pg 337 Ex 12A
		Solving geometric problems	Pg 344 Ex 12B
Chapter 13	Integration	Basic integration	Pg 288 Ex13A, Pg 290 Ex13B
		Finding functions	Pg 293 Ex13C
		Definite integrals	Pg 295 Ex13D
		Areas under curves and between curves and lines	Pg 297 Ex13E, Pg 300 Ex13F, Pg 302 Ex13G
Chapter 14	Exponentials & Logarithms	Exponential functions	Pg 312 Ex 14A
		$y = e^x$	Pg 314 Ex14B
		Exponential functions	Pg 316 Ex14C
		Logarithms, laws of logs and solving equations	Pg 318 - 324 Ex14D - F
		Natural logarithms	Pg 326 Ex14G
		Logarithms and non-linear data	Pg 328 Ex14H

Applied Stats Year 1/AS			
Chapter 1	The Large Data Set	Large Data Set introduction in computer room	LDS Summary page
Chapter 1	Data Collection	Population and samples	Pg 2Ex1A
		Sampling	Pg 4 Ex1B, Pg 7 Ex 1C
		Types of data	Pg 9 Ex1D
		Large data set	Pg 11 Ex1E
Chapter 2	Measure of location & spread	Measures of central tendency (mean, mode, median)	Pg 21 Ex2A, Pg 24 Ex2B
		Other measures of location (quartiles and percentiles)	Pg 25 Ex2C
		Measures of spread	Pg 28 Ex2D
		Variance and standard deviation	Pg 30 Ex2E
		Coding	Pg 33 Ex2F
Chapter 3	Representation of data	Outliners and boxplots	Pg 41 Ex3A, Pg 43 Ex3B
		Cumulative frequency	Pg 46 Ex3C
		Histograms	Pg 48 Ex3D
		Comparing data	Pg 53 Ex3E
Chapter 5	Probability	Calculating probabilities	Pg 70 Ex5A
		Venn diagrams	Pg 72 Ex5B
		Mutually exclusive and independent events	Pg 75 Ex5C
		Tree diagrams	Pg 78 Ex5D
A2 Chapter 2	Conditional probability	Set notation	Pg 17 Ex2A
		Conditional probability	Pg 21 Ex2B

		Venn diagrams	Pg 24 Ex2C
		Probability formulae	Pg 27 Ex2D
		Tree diagrams	Pg 31 Ex2E
Chapter 6	Statistical distributions	Probability distributions	Pg84 Ex6A
		Binomial distributions	Pg 88 Ex6B, Pg 91 Ex6C
Chapter 7	Hypothesis Testing	Hypothesis Testing	Pg 99 Ex7A
		Finding critical regions	Pg 101 Ex7B
		One tailed tests	Pg 105 Ex7C
		Two tailed tests	Pg 107 Ex7D

Applied Further Stats Year 1/AS			
Chapter 1	Discrete Random Variables	Expected value of a discrete random variable Variance of a discrete random variable Expected value and variance of a function of x Solving problems involving random variables	Pg 2 Pg 5 Pg 7 Pg 11
Chapter 2	Poisson Distribution	The Poisson Distribution	Pg 20
		Modelling with Poisson	Pg 23
		Adding Poisson distributions	Pg 27
		Mean & Variance of Poisson	Pg 30
		Mean & Variance of Binomial	Pg 32
		Using the Poisson distribution to approx. the binomial distribution	Pg 34
Chapter 4	Hypothesis Testing	Testing for the mean of a Poisson distribution	Pg 59

		Finding critical regions for a Poisson distribution	Pg 62
Chapter 6	Chi-squared tests	Goodness of Fit	Pg 92
		Degrees of freedom & the chi-squared family of distributions	Pg 96
		Testing a hypothesis	Pg 99
		Testing the goodness of fit with discrete data	Pg 103
		Using contingency tables	Pg 113

Applied Mechanics Year 1/AS			
Chapter 8	Modelling in Mechanics	Constructing a model and modelling assumptions	Pg 118 Ex 8A, Pg 120 Ex 8B
		Quantities and units	Pg 122 Ex 8c
		Working with vectors	Pg 125 Ex 8D
Chapter 9	Constant acceleration	Displacement time graphs	Pg 130 Ex9A
		Velocity time graphs	Pg 133 Ex9B
		Constant acceleration (suvat) formulae	Pg 137 Ex9C, Pg 142 Ex 9D
		Vertical motion under gravity	Pg 146 Ex9E
Chapter 10	Forces & Motion	Forces diagrams	Pg 156 Ex10A
		Forces as vectors	Pg 160 Ex10B
		Forces and acceleration	Pg 162 Ex10C
		Motion in 2 dimensions	Pg 166 Ex10D
		Connected particles and pulleys	Pg 169 Ex10E, Pg 173 Ex10F
A2 Chapter 5	Forces & Friction	Resolving forces	Pg 91 Ex5A
		Inclined planes	Pg 96 Ex5B
		Friction	Pg 100 Ex5C

A2 Chapter 7	Application of forces	Static particles – excluding moments	Pg 129 Ex7A, Pg 133 Ex7B
		Friction and static particles	Pg137 Ex7C
		Dynamic and inclined planes	Pg 147 Ex7E
		Connected particles	Pg 150 Ex7F
Chapter 11	Variable acceleration	Functions of time	Pg 182 Ex11A
		Using differentiation, maxima and minima problems	Pg 185 Ex11B, Pg 186 Ex 11C
		Using Integration	Pg 188 Ex11D
		Constant acceleration (suvat) formulae	Pg 191 Ex11E

Applied Further Mechanics Year 1/AS			
Chapter 1	Momentum and impulse	Momentum in one direction	Pg 2
		Conservation of momentum	Pg 4
		Momentum as a vector (A2 content, taught in Y12)	Pg 9
Chapter 2	Work, Energy and Power	Work done	Pg 16
		Kinetic and potential energy	Pg 20
		Conservation of mechanical energy & the work-energy principle	Pg 24
		Power	Pg 29
Chapter 4	Elasticity	Direct impact & Newton's law of restitution	Pg 70
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		Loss of kinetic energy	Pg 79
		Successive direct impacts	Pg 84

AS Further Maths Core Year 1/AS			
Chapter 1	Complex Numbers	Imaginary and complex numbers	Pg 2
		Multiplying complex numbers	Pg 5
		Complex conjugation	Pg 5
		Roots of quadratic equations	Pg 10
Chapter 2	Argand Diagrams	Argand diagrams	Pg 18
		Modulus and argument	Pg 20
		Modulus-argument form of complex numbers	Pg 23
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Chapter 3	Series	Sums of natural numbers	Pg 44
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Chapter 4	Roots of Polynomials	Roots of a quadratic equation	Pg 55
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		Inverting a 3 x 3 matrix	Pg 112
		Solving systems of equations using matrices	Pg 116

Chapter 7	Linear Transformations	Linear transformations in two dimensions	Pg 127
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		Enlargements and stretches	Pg 136
		Successive transformations	Pg 140
		Linear transformations in 3D	Pg 144
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		Proving statements involving matrices	Pg 162
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		Equation of a plane in 3D	Pg 175
		Scalar product	Pg 178
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		Finding perpendiculars	Pg 193