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| **Term** | **INTENT** | **IMPLEMENTATION** | **IMPACT** |
| **Substantive Knowledge**  This is the specific, factual content for the topic, which should be connected into a careful sequence of learning. | **Disciplinary Knowledge (Skills)**  This is the action taken within a particular topic in order to gain substantive knowledge. | **Assessment opportunities**  What assessments will be used to measure student progress?  Evidence of how well students have learned the intended content. |
| **Autumn Term**  **1A**  **Year 12** | Pure  Chapter 1: Algebraic Expressions   * + 1.1 Index Laws   + 1.2 Expanding Brackets   + 1.3 Factorising   + 1.4 Negative and Fractional Indices   + 1.5 Surds   + 1.6 Rationalising Denominators   Chapter 2: Quadratics   * 2.1 Solving Quadratic Equations * 2.2 Completing the Square * 2.3 Functions * 2.4 Quadratic Graphs * 2.5 The Discriminant * 2.6 Modelling with Quadratics   Chapter 3: Equations and Inequalities   * 3.1 Linear Simultaneous Equations * 3.2 Quadratic Simultaneous Equations * 3.3 Simultaneous Equations on Graphs * 3.4 Linear Inequalities * 3.5 Quadratic Inequalities * 3.6 Inequalities on Graphs * 3.7 Regions   Chapter 4: Graphs and Transformations   * 4.1 Cubic Graphs * 4.2 Quartic Graphs * 4.3 Reciprocal Graphs * 4.4 Points of intersection * 4.5 Translating Graphs * 4.6 Stretching Graphs * 4.7 Transforming Functions   Chapter 5: Straight Line Graphs   * 5.1 y=mx+c * 5.2 Equations of Straight Lines * 5.3 * Parallel and Perpendicular Lines * 5.4 Length and Area * 5.5 Modelling with Straight Lines   Chapter 7: Algebraic Methods   * 7.1 Algebraic Fractions * 7.2 Dividing Polynomials * 7.3 The Factor Theorem * 7.4 Mathematical Proof * 7.5 Methods of Proof | Chapter 1: Algebraic Expressions  • Apply the laws of indices  • Expand brackets of a single term and two or three expressions  • Factorise linear, quadratic and simple cubic expressions  • Simplify surds and use the rules of surds  • Multiply brackets using surds  • Rationalise denominators with surds  Chapter 2: Quadratics  • Solving quadratic equations by factorising, quadratic formula and completing the square  • Sketching quadratic functions as graphs and find the turning points  • Find and interpret the discriminant  • Modelling with quadratics  Chapter 3: Equations and Inequalities   * Solve linear simultaneous equations using elimination or substitution * Solve simultaneous linear and quadratic equations algebraically * Solve simultaneous linear and quadratic equations graphically * Solution of linear and quadratic inequalities in one variable   Represent and interpret inequalities graphically  Chapter 4: Graphs and Transformations   * Sketching graphs of cubic, quartic and reciprocal functions * Solving equations using intersections of graphs * Transformation of graphs af(x), f(x) + a, f(x + a), f(ax)   Transform graphs of unfamiliar functions  Chapter 5: Straight Line Graphs   * Calculate the gradient of a line joining a pair of points * Find the equation of a line through to points expressing it in the form y = mx + c or ax + by + c = 0 * Find the point of intersection for a pair of straight lines * Know and use the rules for parallel and perpendicular gradients * Solve length and area problems on coordinate grids * Use straight lines to construct mathematical models   Chapter 7: Algebraic Methods   * Simplify rational algebraic expressions * Algebraic Division by a linear expression * Use the Factor Theorem to factorise a cubic expression * Construct mathematical proof using algebra * Use proof by exhaustion and counter- example | * Year 12 baseline test * In class teacher assessment through Q&A * End of chapter mini test (with peer marking) * Chapter revision exercise via textbook * End of term review exercises via textbook * End of term formal mixed chapter assessment * Mymaths topic codes:   1.1: 2033  1.2:  1.3: 2006, 2014  1.4: 2034, 2035  1.5: 2036  1.6: 2037,2255  Recap chp 1: 3006  2.1: 2015, 2016  2.2: 2017  2.3: 2257(Q1)  2.4: 2025  2.5: 2026, 3004  2.6:  3.1:  3.2: 2018  3.3:  3.4: 2008  3.5: 2009, 2256  3.6:  3.7:  4.1:  4.2: 2027  4.3:  4.4:  4.5:  4.6:  4.7: 2022, 2023, 2024  5.1: 2002, 2003  5.2: 2004, 2005  5.3: 2252(Q1), 3042  5.4:  5.5:  7.1:  7.2: 2043  7.3: 2042, 2259  7.4:  7.5: 2252, 2253 |
| **Autumn Term**  **1B**  **Year 12** | Chapter 6: Circles   * 6.1 Midpoints and Perpendicular Bisectors * 6.2 Equation of a Circle * 6.3 Intersections of Straight Lines and Circles * 6.4 Use Tangent and Chord Properties * 6.5 Circles and Triangles   Chapter 8: The Binomial Expansion   * 8.1 Pascals Triangle * 8.2 Factorial Notation * 8.3 The Binomial Expansion * 8.4 Solving Binomial Problems * 8.5 Binomial Estimation   Chapter 9: Trigonometry   * 9.1 The Cosine Rule * 9.2 The Sine Rule * 9.3 Areas of Triangles * 9.4 Solving Triangle Problems * 9.5 Graphs of sine, cosine and tangent * 9.6 Transforming Trigonometric Graphs   Chapter 12: Differentiation   * 12.1 Gradients of Curves * 12.2 Finding the Derivative * 12.3 Differentiating xn * 12.4 Differentiating Quadratics * 12.5 Differentiating Functions with two or more terms * 12.6 Gradients, tangents and normal * 12.7 Increasing and decreasing Functions * 12.8 Second Order Derivatives * 12.9 Stationary Points * 12.10 Sketching Gradient Functions * 12.11 Modelling with Differentiation   Chapter 13: Integration   * 13.1 Integrating xn * 13.2 Indefinite Integrals * 13.3 Finding Functions * 13.4 Definite Integrals * 13.5 Areas Under Curves * 13.6 Areas Under the x-axis * 13.7 Areas Between Curves and Lines | Chapter 6: Circles  • Find the midpoint of a line segment  • Find the equation of the perpendicular bisector to a line segment  • Know how to find the equation of a circle  • Solve geometric problems involving straight lines and circles  • Use circle properties to solve problems on coordinate grids  • Find the angle in a semicircle and solve other problems involving circles and triangles  Chapter 8: The Binomial Expansion  • Use Pascals triangle to identify coefficients and use them to expand simple binomial expressions  • Use combination and factorial notation  • Use the binomial expansion to expand brackets  • Find individual coefficients in a binomial expansion  • Make approximations using the binomial expansion  Chapter 9: Trigonometry   * Use the cosine rule to find a missing side or angle * Use the sine rule to find a missing side or angle * Find the area of a triangle using the appropriate formula * Solve problems involving triangles * Sketch the graphs of the sine, cosine and tangent functions * Sketch simple transformations of trigonometric graphs   Chapter 12: Differentiation   * Find the derivative, f’(x) or of a simple function * Use the derivative to solve problems involving gradients, tangents and normal * Identify increasing and decreasing functions * Find the second order derivative, f’’(x) or , of a simple function * Find the stationary points of functions and determine their nature * Sketch the gradient function of a given function * Model real-life situations with differentiation   Chapter 13: Integration   * Find y given for xn * Integrate polynomials * Find f(x), given f’(x) and a point on the curve * Evaluate a definite integral * Find the area bounded by a curve and the x-axis * Find areas bounded by curves and straight lines | * In class teacher assessment through Q&A * End of chapter mini test (with peer marking) * Chapter revision exercise via textbook * End of term review exercises via textbook * End of term formal assessments * Mastery homework with use of mymaths.co.uk * Mymaths topic codes:   6.1: 2001  6.2: 2020  6.3:  6.4: 2021  6.5:  8.1:  8.2:  8.3:  8.4:  8.5: 2041  9.1: 2046  9.2: 2045  9.3:  9.4:  9.5:  9.6: 2049  12.1:  12.2:  12.3:  12.4:  12.5:  12.6: 2028, 2029, 2030  12.7:  12.8:  12.9: 2270  12.10: 2269  12.11:  Chapter 12 revision: 3005  13.1:  13.2: 2054  13.3: 2055  13.4:  13.5: 2056  13.6: 2057  13.7: 2059, 2273, 2274  Chapter 13 revision: 3045 |
| **Spring Term**  **2A**  **Year 12** | Chapter 10: Trigonometric Identities and Equations   * 10.1 Angles in all four quadrants * 10.2 Exact values of trigonometric ratios * 10.3 Trigonometric Identities * 10.4 Simple Trigonometric Equations * 10.5 Harder Trigonometric Equations * 10.6 Equations and Identities   Chapter 11: Vectors   * 11.1 Vectors * 11.2 Representing Vectors * 11.3 Magnitude and Direction * 11.4 Position Vectors * 11.5 Solving Geometric Problems * 11.6 Modelling with Vectors   Chapter 14: Exponentials and Logarithms   * 14.1 Exponential Functions * 14.2 y = ex * 14.3 Exponentials Modelling * 14.4 Logarithms * 14.5 Laws of Logarithms * 14.6 Solving Equations using Logarithms * 14.7 Working with Natural Logarithms * 14.8 Logarithms and Non-Linear Data | Chapter 10: Trigonometric Identities and Equations   * Calculate the sine, cosine and tangent of any angle * Know the exact trigonometric ratios for 30o, 45o and 60o * Know and use tan θ = and sin2 θ + cos2 θ = 1 * Solve simple trigonometric equations of the form sin θ = k, cos θ = k and tan θ = k * Solve more complicated trigonometric equations of the form sin nθ = k and sin (θ ± α) = k and equivalent equations involving cos and tan * Solve trigonometric equations that produce quadratics   Chapter 11: Vectors   * Use vectors in two dimensions * Use column vectors and carry out arithmetic operations on vectors * Calculate the magnitude and directions of a vectors * Understand and use position vectors * Use vectors to solve geometric problems * Understand vector magnitude and use vectors in speed and distance calculations * Use vectors to solve problems in context   Chapter 14: Exponentials and Logarithms  • Sketch graphs of the form y = ax, y = ex and transformations of these graphs  • Differentiate ekx and understand why the result is important  • Use and interpret models that use exponential functions  • Recognise the relationship between exponents and logarithms  • Recall and apply the laws of logarithms  • Solve equations of the form ax = b  • Describe and use the natural logarithm function  • Use logarithms to estimate the values of constants in non-linear models | * In class teacher assessment through Q&A * End of chapter mini test (with peer marking) * Chapter revision exercise via textbook * End of term review exercises via textbook * End of term formal assessments * Mastery homework with use of mymaths.co.uk * Mymaths topic codes:   10.1:  10.2: 2284  10.3:  10.4: 2047, 2048  10.5: 2257(Q2), 2285  10.6: 2053  Chapter 10 revision: 3010, 3043  11.1:  11.2:  11.3: 2206  11.4: 2207  11.5:  11.6: 3048  14.1: 2061  14.2: 2133  14.3: 2136  14.4: 2142  14.5: 2062  14.6: 2257(Q1), 2063  14.7: 2134, 2135  14.8: 2268  Chapter 14 revision: 3012, 3022  Year 1 revision: 3002, 3003 |
| **Spring Term**  **2B**  **Year 12** | Statistics  Chapter 1: Data Collection   * 1.1 Populations and Samples * 1.2 Sampling * 1.3 Non-Random Sampling * 1.4 Types of Data * 1.5 The Large Data Set   Chapter 2: Measures of Location and Spread   * 2.1 Measures of Central Tendency * 2.2 Other Measures of Location * 2.3 Measures of Spread * 2.4 Variance and Standard Deviation * 2.5 Coding   Chapter 3: Representations of Data   * 3.1 Outliers * 3.2 Box Plots * 3.3 Cumulative Frequency * 3.4 Histograms * 3.5 Comparing Data   Chapter 4: Correlation   * 4.1 Correlation * 4.2 Linear Regression   Mechanics  Chapter 8: Modelling in Mechanics   * 8.1 Constructing a Model * 8.2 Modelling Assumptions * 8.3 Quantities and Units * 8.4 Working with Vectors   Chapter 9: Constant Acceleration   * 9.1 Displacement-Time Graphs * 9.2 Velocity-Time Graphs * 9.3 Constant Acceleration Formulae 1 * 9.4 Constant Acceleration Formulae 2   9.5 Vertical Motion Under Gravity | Statistics  Chapter 1: Data Collection  • Understand ‘population’, ‘sample’ and ‘census’ and comment on the advantages and disadvantages of each  • Understand the advantages and disadvantages of simple random sampling, systematic sampling, stratified sampling, quota sampling and opportunity sampling  Chapter 2: Measures of Location and Spread  • Calculate measures of central tendency such as mean, median and mode  • Calculate measure of location such as percentiles and deciles   * Calculate measures of spread such as range, interquartile range and interpercentile range * Calculate variance and standard deviation * Understand and use coding   Chapter 3: Representations of Data  • Identify outliers in data sets   * Draw and interpret box plots * Draw and interpret cumulative frequency diagrams * Draw and interpret histograms * Compare two data sets   Chapter 4: Correlation  • Draw and interpret scatter diagrams for bivariate data  • Interpret correlation and understand that it does not cause imply causation   * Interpret the coefficients of a regression line equation for bivariate data * Understand when to use a regression line to make predictions   Mechanics  Chapter 8: Modelling in Mechanics  • Understand how the concept of a mathematical model applies to mechanics  • Understand and be able to apply some of the common assumptions used in mechanical models   * Know SI units for quantities and derived quantities used in mechanics * Know the difference between scalar and vector quantities   Chapter 9: Constant Acceleration  • Understand and interpret displacement-time graphs  • Understand and interpret velocity-time graphs   * Derive the constant acceleration formulae and use them to solve problems * Use the constant acceleration formulae to solve problems involving vertical motion under gravity | * In class teacher assessment through Q&A * End of chapter mini test (with peer marking) * Chapter revision exercise via textbook * End of term review exercises via textbook * End of term formal assessments * Mastery homework with use of mymaths.co.uk * Mymaths topic codes:   1.3: 2275  2.1: 2279  2.2: 2282  2.3: 2280  2.4: 2281  Chapter 2 review: 3251, 3015  3.2: 2276  3.3: 2277  3.4: 2278  Chapter 3 review: 3253  4.1: 2283  Chapter 3 and 4 review: 3252  9.2: 2183  9.4: 2184  9.5: 2185 |
| **Summer Term**  **3A**  **Year 12** | Statistics  Chapter 5: Probability   * 5.1 Calculating with Probabilities * 5.2 Venn Diagrams * 5.3 Mutually Exclusive and Independent Events * 5.4 Tree Diagrams   Chapter 6: Statistical Distributions   * 6.1 Probability Distributions * 6.2 The Binomial Distribution * 6.3 Cumulative Probabilities   Chapter 7: Hypothesis Testing   * 7.1 Hypothesis Testing * 7.2 Finding Critical Values * 7.3 One-tailed Tests * 7.4 Two Tailed Tests   Mechanics  Chapter 10: Forces and Motion   * 10.1 Force Diagrams * 10.2 Forces as Vectors * 10.3 Forces and Acceleration * 10.4 Motion in 2 Dimensions * 10.5 Connected Particles * 10.6 Pulleys   Chapter 11: Variable Acceleration   * 11.1 Functions of Time * 11.2 Using Differentiation * 11.3 Maxima and Minima Problems * 11.4 Using Integration * 11.5 Constant Acceleration Formulae | Chapter 5: Probability  • Calculate probabilities for single events  • Draw and interpret Venn diagrams   * Understand mutually exclusive and independent events, and determine whether two events are independent * Use and understand tree diagrams     Chapter 6: Statistical Distributions  • Understand and use simple discrete probability distributions including the discrete uniform distribution  • Understand the binomial distribution as a model and comment on appropriateness   * Calculate individual probabilities for the binomial distribution * Calculate cumulative probabilities for the binomial distribution   Chapter 7: Hypothesis Testing  • Understand the language and concept of hypothesis testing  • Understand that a sample is used to make an inference about a population   * Find the critical values of a binomial distribution using tables * Carry out a one-tailed test for the proportion of the binomial distribution and interpret the results * Carry out a two-tailed test for the proportion of the binomial distribution and interpret the results   Chapter 10: Forces and Motion  • Draw force diagrams and calculate resultant forces  • Understand and use Newton’s first law   * Calculate resultant forces by adding vectors * Understand and use Newton’s second law, F = ma * Apply Newton’s second law to vector forces and acceleration * Understand and use Newton’s third law * Solve problems involving connected particles   Chapter 11: Variable Acceleration  • Understand that displacement, velocity and acceleration may be given as functions of time  • Use differentiation to solve kinematic problems   * Use calculus to solve problems involving maxima and minima * Use integration to solve kinematic problems * Use calculus to derive constant acceleration formulae | * In class teacher assessment through Q&A * End of chapter mini test (with peer marking) * Chapter revision exercise via textbook * End of term review exercises via textbook * End of term formal assessments * Mastery homework with use of mymaths.co.uk * Mymaths topic codes:   5.1: 2091  5.2: 2092, 2095  5.3: 2093  5.4: 2094  Chapter 5 review: 3250  6.1: 2114  6.2: 2110, 2111  6.3: 2112  Chapter 6 review: 3018, 3019  7.3: 2115  10.1: 2186  10.3: 2187  10.4: 2293  10.5: 2188  Chapter 10 review: 3030  11.2: 2289, 3027  11.3: 2180  11.4: 2181 |
| **Summer Term**  **3B**  **Year 12** | Pure  Chapter 1: Algebraic Methods   * + 1.1 Proof by Contradiction   + 1.2 Algebraic Fractions   + 1.3 Partial Fractions   + 1.4 Repeated Factors   + 1.5 Algebraic Division   Chapter 2: Functions and Graphs   * 2.1 The Modulus Function * 2.2 Functions and Mappings * 2.3 Composite Functions * 2.4 Inverse Functions * 2.5 and * 2.6 Combining Transformations * 2.7 Solving Modulus Problems   Chapter 5: Radians   * 5.1 Radian Measure * 5.2 Arc Length * 5.3 Areas of Sectors and Segments * 5.4 Solving Trigonometric Equations * 5.5 Small Angle Approximations   Chapter 6: Trigonometric Functions   * 6.1 Secant, Cosecant and Cotangent * 6.2 Graphs of sec x, cosec x and cot x * 6.3 Using sec x, cosec x and cot x * 6.4 Trigonometric Identities * 6.5 Inverse Trigonometric Functions | Chapter 1: Algebraic Methods   * Use proof by contradiction to prove true statements * Multiply and divide two or more algebraic fractions * Add or subtract two or more algebraic fractions * Convert an expression with linear factors in the denominator into partial fractions * Convert an expression with repeated linear factors in the denominator into partial fractions * Divide algebraic expressions * Convert an improper fraction into partial fraction form     Chapter 2: Functions and Graphs   * Understand and use the modulus function * Understand mappings and functions, and use domain and range * Combine two or more functions to make a composite function * Know how to find the inverse of a function graphically and algebraically * Sketch the graphs of the modulus functions y= |f(*x*)| and y= f(|*x*|) * Apply a combination of two (or more) transformations to the same curve * Transform the modulus function   Chapter 5: Radians   * Convert between degrees and radians and apply this to trigonometric graphs and their transformations * Know exact values of angles measured in radians * Find an arc length using radians * Find areas of sectors and segments using radians * Solve trigonometric equations in radians * Use approximate trigonometric values when is small   Chapter 6: Trigonometric functions   * Understand the definitions of secant, cosecant and cotangent and their relationship to cosine, sine and tangent * Understand the graphs of secant, cosecant and cotangent and their domain and range * Simplify expressions, prove simple identities and solve equations involving secant, cosecant and cotangent * Prove and use sec2*x*1 + tan2*x* and cosec2*x* 1 + cot2*x* | * In class teacher assessment through Q&A * End of chapter mini test (with peer marking) * Chapter revision exercise via textbook * End of term review exercises via textbook * End of term formal mixed chapter assessment * Mymaths topic codes:   1.1: 2254  1.2: 2200  1.3: 2260    2.3: 2007, 2139  2.4: 2138, 2040  2.5: 2261  2.7: 3023  5.3: 2050  5.4: 2155  5.5: 2266  6.3: 2019  6.4: 2156 |