TOLL BAR SIXTH FORM

A-Level Mathematics Curriculum Overview Map Year 12

Autumn Term

Y2 Vectors
Students will extend their knowledge of vectors to three dimensions. They will be required to use these vectors to describe displacement, velocity and acceleration.

$\bar{a} = \overline{OA} = xi + yj + zk$

$|\bar{a}| = \sqrt{x^2 + y^2 + z^2}$

Y2 Radians
Students will be introduced to radian measures. They will extend their skills in solving trigonometric equations to include the use of radians.

Probability
Students will work with probability including conditional, independent and mutually exclusive events. Using Venn diagrams and Tree diagrams.

Integration
Students will reverse the process of differentiation and recognise this as integration. They will then use this method to find the equation of a curve and the area between the curve and the x-axis.

Circles
Students will look at using co-ordinates to represent lines and circles. They will use equations to represent those shapes and find their intersections.

Straight line graphs
Students will continue to work with linear graphs and their coordinates finding an equation in the form $y = mx + c$. Students will also find points of intersection and using perpendicular and parallel lines to solve problems involving area.

Spring Term

Y2 Regression and Correlation
Students will use exponential models for bivariate data coding using logs. Students will also calculate PMCC, using hypothesis testing for zero correlation.

Y2 Functions and Graphs
Students will focus on developing the theory of functions. This will include; understanding mappings, types of functions, domain and range, composite functions and inverse functions. Students will also work with modulus functions including their graph, transformations and solving problems using modulus.

Y2 Algebraic Methods
Students will work with manipulate using pa fractions including those with repeated fa and where algebraic division is required.

Forces and Motion
Students will construct and solve forces problems, including those involving connected particle and pulleys.

Statistical Distributions
Students will use probability distributions including binomial distributions and finding cumulative probabilities.

Variable Acceleration
Students will to solve problems using differentiation and integration to move between displacement, velocity and acceleration.

Hypothesis Testing
Students will recap their knowledge of sampling and will be introduced to the process of hypothesis testing using the binomial distribution

Exponentials and Logarithms
Students will discover the concept of logarithms and learn about the laws of logarithms and how to use them to solve problems involving exponential functions.

Trigonometric Identities
Students solve problems identifying angles in all four quadrants with the simple trigonometric identities leading to solving harder equations and identities.

Correlation
Students will construct and interpret scatter graphs for bivariate data. Developing their understanding of the coefficients of a regression line in context.

Representations of Data
Students will review the construction and interpretation of statistical diagrams.

Measures of location and spread
Students will calculate and use summary statistics. It will be essential for students to learn how to use calculator functions to support them.

Constant Acceleration
Students derive and use equations for motion with constant acceleration. They will apply CA formulae to vertical motion under gravity.

Trigonometric Ratios
Students will study the basic properties of the sine, cosine and tangent functions. In addition, they will develop their knowledge of the trigonometric graphs including transforming these.

Vectors
Students will learn about the different ways to represent vectors and use them to solve geometrical problems.

Summer Term

Algebraic Methods
Students will work with algebraic fractions, divide polynomials and apply the factor theorem.

Binomial Expansion
Students will learn how to expand binomial expressions for any positive integer. They will then use parts of their expansions to find approximations.

Differentiation
Students will study the process and rules of differentiation for simple functions. This will be extended to include the applications of differentiation including; finding a gradient at a given point, stationary points and optimisation.

Data collection
Students will develop their understanding of different sampling methods including the advantages and disadvantages of each. They will also study the different

Quadratics
Students will recap methods for solving quadratics and inequalities. They will also be introduced to the discriminant and disguised quadratic equations

Modelling in Mechanics
Students will study the concept of using a mathematical model in mechanics. They will expand their knowledge of the standard vocabulary used in mechanics and the associated assumptions. Consistently working with SI units. In addition, they will work with vectors developing an understanding of scalar and vector quantities.

Graphs and Transformations
Students will develop their knowledge of using graphs and the links to simultaneous equations and transforming graphs.

Algebraic expressions
Students will review all grade 9 algebra including index laws including use of negative and fractional indices, algebraic manipulation, surds including rationalising the denominator.

Equations and Inequalities
Students will solve simultaneous equations both linear and quadratic including graphically. They will also work with inequalities including graphically.

$9x^2 + 3x - 2 > 0$

YEAR 13

Mock Exam