# Spring Term plan

# Year 12 Mathematics A Level

| Mrs Laidler/Mr Storey-Scott | Mr Bullock/Mr Ahluwalia |
|---|---|
| **CORE**<br>**Integration**<br>• Know and use the Fundamental Theorem of Calculus<br>• understand that differentiation is the 'reverse' of integration and vice versa<br>• Integrate $x^n$ (excluding n = –1), and related sums, differences and constant multiples<br>• include a constant of integration when finding an indefinite integral<br>• Evaluate definite integrals and use a definite integral to find the area under a curve<br><br>**Mechanics**<br>**Vectors**<br>• Identify vector and scale<br>• Use vectors in two dimensions with both column vectors and i, j notation,<br>• Calculate the magnitude and direction of a vector and convert between component form and magnitude/direction form<br>• Solve problems involving displacements velocities and forces<br>• prove that two vectors are parallel and understand collinearity<br>• Use the position vectors to find displacements and distances<br>• Use vectors to solve problems in pure mathematics and in context<br><br>**Kinematics**<br>• Understand and use fundamental quantities and units in the SI system: length, time, mass.<br>• Understand and use derived quantities and units: velocity, acceleration, force, weight<br>• Calculate average speed and average velocity<br>• Draw and interpret graphs of displacement and velocity against time<br>• Derive and use the formulae for motion<br>• Use calculus in kinematics for motion in a straight line with variable acceleration<br><br>**Forces**<br>• Resolve forces in two perpendicular directions<br>• Calculate the magnitude and direction of a resultant force<br>• Resolve for connected particles with constant acceleration<br>• Understand mass and weight | **STATISTICS**<br>**Probability**<br>• Use the vocabulary of probability theory, including the terms random experiment, sample space, independent events and mutually exclusive events<br>• Solve problems involving mutually exclusive and independent events using the addition and multiplication rules<br>• Use a probability function or a given context to find the probability distribution and probabilities for particular events<br>• Recognise and solve problems relating to experiments which can be modelled by the Binomial distribution<br>**Hypothesis Testing**<br>• Understand and apply the language of statistical hypothesis testing, developed through a binomial model<br>• Conduct a statistical hypothesis test for the proportion in the binomial distribution and interpret the results in context.<br>• Understand that a sample is being used to make an inference about the population and appreciate that the significance level is the probability of incorrectly rejecting the null hypothesis<br><br>**Statistics review and assessment**<br>**CORE**<br>**Curve Sketching**<br>• Analyse a function and sketch its graph<br>• understand, use and sketch straight-line graphs (including vertical and horizontal)<br>• understand and use polynomials up to cubic (including sketching curves)<br>• understand and use cubic polynomials with at least one linear factor.<br>• distinguish between the various possibilities for graphs of cubic polynomials indicating where graphs meet coordinate axes<br>• understand and use graphs of the functions $y = a/x$ and $y = a/x^2$, as well as simple transformations of these graphs (including sketching curves).<br>• Understand the effect of simple transformations on the graph of $y = f(x)$ including sketching associated graphs:<br>$y = af(x)$, $y = f(x) + a$, $y = f(x + a)$ and $y = f(ax)$ |
| **End of term assessment** | |