Park House School - Year 12

Further Maths Assessment Manifest

- You will have 2 further maths papers
- These will be 55 minutes in your lesson

Core Pure

Topics	Red	Amber	Green
I can construct proofs using mathematical induction with contexts to include sums of series, divisibility and powers of matrices			
I can solve any quadratic equation with real coefficients			
I can solve cubic or quartic equations with real coefficients			
I can add, subtract, multiply and divide complex numbers in the form x+iy with x and y real			
I understand and use the terms 'real part' and 'imaginary part'			
I understand and use the complex conjugate			
I know that non-real roots of polynomial equations with real coefficients occur in conjugate pairs			
I can use and interpret Argand diagrams			
I can convert between Cartesian form and the modulus-argument form of a complex numbers			
I can multiply and divide complex numbers in modulus-argument form			
I can construct and interpret simple loci in the Argand diagram such as |z-a|>r and arg(z-a)=theta			
I can add, subtract and multiply conformable matrices			
I can multiply a matrix by a scalar			
I understand and use zero and identity matrices			
I use matrices to represent linear transformations in 2-D			
I can perform successive matrix transformations			
I can perform and describe a single transformation in 3-D			
I can find invariant points and lines for linear transformations			
I can calculate determinants of 2x2 and 3x3 matrices and interpret as scale factors, including the effect on orientation			
I understand and use singular and non-singular matrices			
I understand the properties of inverse matrices			
I can calculate and use the inverse of non-singular 2x2 and 3x3 matrices			
I can solve three linear simultaneous equations in three variables by use of the inverse matrix			
I can interpret geometrically the solution and failure of solution of three simultaneous linear equations			
I understand and use the relationship between roots and coefficients of polynomial equations up to quartic equations			
I can form a polynomial equation whose roots are a linear transformation of the roots of a given polynomial equation (of at least cubic degree)			
I understand and use formulae for the sum of integers, squares and cubes and use these to sum other series			
I can derive formulae for and calculate volumes of revolution			

I understand and use the vector and Cartesian forms of an equation of a straight line in 3-D			
I understand and use the vector and Cartesian forms of the equation of a plane			
I can calculate the scalar product and use it to express the equation of a plane, and to calculate the angle between two lines, the angle between two planes and the angle between a line and a plane			
I can check whether vectors are perpendicular by using the scalar product			
I can find the intersection of a line and a plane			
I can calculate the perpendicular distance between two lines, from a point to a line and from a point to a plane			

Statistics

Topics	Red	Amber	Green
I can calculate the mean and variance of discrete probability distributions			
I can extend this to find the expected value function to include E(g(x))			
I can understand and use the Poisson distribution			
I can use the additive property of Poisson distributions			
I can find the mean and variance of the binomial distribution and the Poisson distribution			
I can use the Poisson distribution as an approximation to the binomial distribution			
I can extend the ideas of hypothesis tests to test for the mean of a Poisson distribution			
I can use the goodness of fit tests and contigency tables			
I can state and test the null and alternative hypotheses			
I can work out the degrees of freedom and use this to find critical values			

Mechanics

Topics	Red	Amber	Green
I can calculate the momentum and impulse			
I can use the impulse-momentum principle			
I can use the principle of the conservation of momentum applied to two spheres colliding directly			
I can calculate the momentum as a vector and use the impulse-momentum principle in vector form			
I can calculate kinetic energy, potential energy, work done and power			
I can use the work-energy principle and the principle of conservation of mechanical energy			
I can use the work-energy principle involving kinetic energy, potential energy and elastic energy			
I can understand and use Newton's law of restitution for the direct impact of elastic spheres			
I can answer problems involving the loss of kinetic energy due to an impact			