

Year: 12

Subject: A-level Further Maths

Summer Term			
What has come before and what comes later:	GCSE		
	Core	Decision	Further Statistics
The Big Questions (What questions will students be able to answer upon mastery of the topic?)	<ul style="list-style-type: none"> Can you use proof by induction to prove that a general statement is true for all positive integers? Can you use proof by induction to prove that a given expression is divisible by a certain integer? Can you use matrix multiplication to prove results involving powers of matrices? Can you represent straight line in vector form? Can you use vectors to represent a line going through 2 points? Can you write an equation of a line in vector form in cartesian form? Can you write the equation of a plane in 3D dimensions in vector form? Can you use a normal vector to write an equation of a plane in cartesian form? Can you calculate the scalar product of 2 vectors? Can you work out the acute angle between 2 vectors? Do you know the property for perpendicular vectors? Can you calculate the angles between lines and planes? Do you know the scalar product form of the equation of a plane? Can you work out the angles between 2 planes? Can you work out if 2 lines with vector equations intersect? Can you work out the intersection point? Do you understand when 2 straight lines are skew? Can you work out the perpendicular distance between 2 lines? Can you work out the perpendicular distance between a point and a line? Can you work out the perpendicular distance between a point a plane? 	<ul style="list-style-type: none"> Do you know when a graph is Eulerian? Do you know when a graph is semi-Eulerian? Can you define the route inspection algorithm? Can you use the route inspection algorithm to find the shortest route for the network? Can you formulate a problem as a linear programming problem? Can you identify decision variables? Can you define an objective function? Can you identify suitable constraints for a problem? Do you understand what is meant by the optimal solution? Can you find the region of a graph that satisfies all the constraints of a linear programming problem? Do you know what this region is called? Can you find the optimal point using the objective line or ruler method? Can you find the optimal point using the vertex method? Can you find the integer solutions to a linear programming problem? 	<ul style="list-style-type: none"> Can you use hypothesis test to test for the mean of a Poisson distribution? Can you state the null and alternative hypothesis? Can you use statistical tables to find critical values? Can you find critical regions of a Poisson distribution using tables. Can you find particular and cumulative values for the regions? Can you use hypothesis tests to test for the parameter p in the geometric distribution? Can you find the critical region of a geometric distribution? Can you reject a null hypothesis based upon statistical evidence? Can you form hypotheses about how well a distributions fits a model of observed data? Do you understand degrees of freedom? Can you use the chi-squared family of distributions? Are you able to test a hypothesis? Are you able to apply goodness of fit tests to discrete data? Are you able to use contingency tables? Can you apply goodness of fit tests to geometric distributions?