

Year: 13

Subject: A-level Further Maths

Autumn Term			
What has come before and what comes later:	Core 1, decision and further statistics year 1		
	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 express a complex number in exponential form? Can you multiply and divide complex numbers in exponential form? Can you explain de Moivre's theorem? Can you use de Moivre's theorem to derive trigonometric identities? Can you use de Moivre's theorem to find sums of series? Can you solve completely equations of the form $z^n - a - ib = 0$, giving special attention to cases where $a=1$ and $b=0$? Can you use complex roots of unity to solve geometric problems? Do you understand and can you use the method of differences to sum finite series? Can you find and use higher derivatives of functions? Can you express functions as an infinite series in ascending powers using Maclaurin series expansion? Can you find the series expansions of compound functions? Can you evaluate improper integrals? Do you understand and can you evaluate the mean value of a function? Can you integrate rational functions using trigonometric substitutions? Can you integrate using partial fractions? Can you find volumes of revolution around the x-axis? Can you find volumes of revolution around the y-axis? Can you find the volumes of revolution for curves defined parametrically? Can you model real-life applications of volumes of revolution? 	<ul style="list-style-type: none"> Can you use the planarity algorithm to determine whether or not a given graph is planar? Can you use the route inspection algorithm in networks with more than four odd nodes? Can you explain the difference between the classical and practical problems related to the travelling salesman problem? Can you use a minimum spanning tree method to find an upper bound? Can you use a minimum spanning tree method to find a lower bound? Can you use the nearest neighbour algorithm to find an upper bound? 	<ul style="list-style-type: none"> Are you able to understand and apply the central limit theorem to approximate the same mean? Are you able to apply the central limit theorem to other distributions? Are you able to understand the use of probability generating functions? Are you able to use probability generating functions for standard distributions? Are you able to use probability generating functions to find the mean and variance of a distribution? Do you know the probability generating function of the sum of independent random variables?

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