

Teacher Subject Specialism Training (TSST)

Workshop Schedule (September 2016 – May 2017)

Workshop Title	Content and curriculum reference*	Date
1. Quadratic equations and graph sketching	<p><i>Sketching graphs using the three forms of a quadratic equation.</i></p> <p><i>Sketching higher order graphs.</i></p> <p><i>Quadratic inequalities.</i></p> <p>Algebra - 11 identify and interpret roots, intercepts, turning points of quadratic functions graphically; deduce roots algebraically and turning points by completing the square</p> <p>Algebra - 12 recognise, sketch and interpret graphs of linear functions, quadratic functions simple cubic functions, the reciprocal function $y = \frac{1}{x}$ with $x \neq 0$, exponential $y=k^x$ functions for positive values of k.</p> <p>Algebra - 22 solve quadratic inequalities in one variable; represent the solution set on a number line, using set notation and on a graph.</p>	Wednesday 21 st September 2016
2. Transformation of graphs & function notation	<p><i>Function notation including inverse and composite functions.</i></p> <p><i>Linear transformations of graphs.</i></p> <p>Algebra - 7 where appropriate, interpret simple expressions as functions with inputs and outputs; interpret the reverse process as the 'inverse function'; interpret the succession of two functions as a 'composite function'.</p> <p>Algebra - 13 Sketch translations and reflections of a given function.</p>	Thursday 13 th October 2016
3. Trigonometric identities	<p><i>Developing conceptual understanding of trigonometric ratios in right angled triangles.</i></p> <p><i>Trigonometry in non-right angled triangles.</i></p> <p>Geometry - 20 - 23 know the formulae for: Pythagoras' theorem, $a^2 + b^2 = c^2$, and the trigonometric ratios; apply them to find angles and lengths in right-angled triangles and, where possible, general triangles in two and three dimensional figures. know the exact values of $\sin\theta$ and $\cos\theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°; know the exact value of $\tan\theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60°. know and apply the sine rule and cosine rule to find unknown lengths and angles. know and apply $Area = \frac{1}{2}absinC$ to calculate the area, sides or angles of any triangle.</p>	Wednesday 23 rd November 2016
4. Non-linear sequences	<p><i>Finding the n^{th} term of quadratic and simple geometric sequences.</i></p> <p><i>Solving problems with sequences in a range of representations.</i></p> <p>Algebra – 24 & 25 recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions, Fibonacci</p>	Wednesday 14 th December 2016

	<p>type sequences, quadratic sequences, and simple geometric progressions and other sequences. deduce expressions to calculate the n^{th} term of linear and quadratic sequences.</p>	
5. Vectors	<p><i>Developing conceptual understanding of vectors in 2-D in a variety of contexts.</i> <i>Proof with vectors.</i> Geometry – 24 & 25 describe translations as 2D vectors. apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; use vectors to construct geometric arguments and proofs.</p>	Thursday 19 th January 2016
6. Complex Transformations/Complex Numbers	<p><i>Solving equations whose solutions are complex numbers. Representing complex numbers on an Argand diagram</i> Complex Numbers – B1** solve any quadratic equation with real coefficients; solve cubic or quartic equations with real coefficients (given sufficient information to deduce at least one root for cubics or at least one complex root or quadratic factor for quartics) Use and interpret Argand diagrams. Construct and interpret simple loci in the Argand diagram.</p>	Wednesday 8 th February 2017
7. 2nd Order Differential Equations	<p><i>Solving 2nd Order Differential Equations (Knowledge of Core 3 differentiation assumed)</i> Differential Equations – I2** Find both general and particular solutions to differential equation. Solve differential equations of form $y'' + ay' + b = 0$ where a and b are constants by using the auxiliary equation. Understand and use the relationship between the cases when the discriminant of the auxiliary equation is positive, zero and negative and the form of solution of the differential equation. Solve differential equations of form $y'' + ay' + b = f(x)$ where a and b are constants by solving the homogeneous case and adding a particular integral to the complementary function (in cases where $f(x)$ is a polynomial, exponential or trigonometric function)</p>	Thursday 23 rd March 2017
8. Consolidation Session – Sine & Cosine functions, Transformation of graphs and Quadratic equations	<p><i>Trigonometric graphs.</i> <i>Application of transformations to trigonometric and quadratic graphs.</i> Algebra – 12 & 13</p>	Thursday 18 th May 2017

* Curriculum references from GCSE subject content and assessment objectives (DfE).

** Curriculum references from GCE Further Mathematics subject content and assessment objectives (DfE).