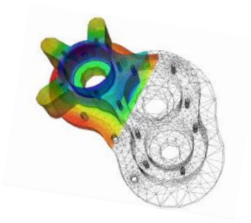
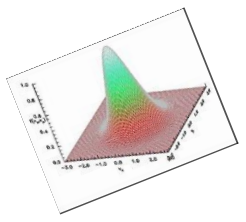
TUXFORD ACADEMY

FURTHER MATHS A-LEVEL LEARNING JOURNEY

AQA 7367
PAPER 1 (33%)–2hr
PAPER 2 (33%)–2hr
PAPER 3 (33%)– 2hr

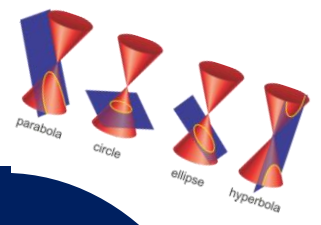
2nd Order Differential Equations
- Auxiliary equations with complex routes
- Simple harmonic motion
- Non-homogeneous 2ODE
- Systems of DEs





Numerical Methods:
- Numerical integration
- Euler's Method

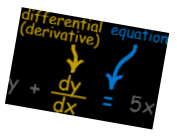
Conics:
- Graphs of conics
- Further transformations



1st Order Differential Equations
- Modelling rates of change
- Separation of variables
- Integrating factors

Circular Motion:
- Circular motion with constant speed
- Circular motion with variable speed
- Modelling the breakdown of circular motion

Centres of Mass and Moments :
- Centre of Mass of 2D and 3D bodies
- Calculating volumes
- Centre of Mass of plane regions

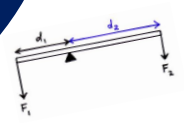


Partial Fractions:
- Harder examples
- Integrating partial fractions using trig substitutions

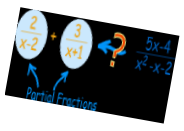
Further Calculus:
- Two limits
- Reduction formula
- Curved lengths and Surface Areas

$$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$$

Momentum and Collisions:
- Conservation of momentum
- Newton's Law of Impact
- Oblique impact of a smooth sphere.



Game Theory:
- Pay off matrices
- Play-safe strategies
- Converting games to linear problems

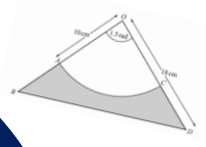


Binary Operations:
- Language of groups
- Cyclic groups
- Subgroups

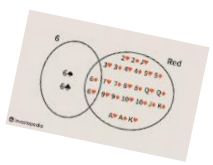
Critical Path Analysis;
- Identifying critical paths
- Gantt charts
- Resource histograms

Linear Programming :
- Optimisation problems
- Simplex Algorithm

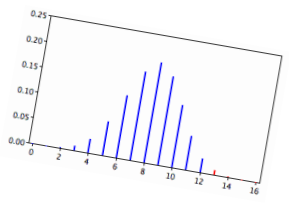
Complex Numbers 3:
- De Moivre's Theorem
- Nth root of complex numbers
- The form n = reiO



Dimensional Analysis:
- Checking consistency of equations
- Standard units of measures



Work, Energy, Power:
- Energy and momentum
- Gravitational Potential Energy
- Power



Polar Integration:
- Finding areas enclosed by a polar curve
- Tangents of polar curves. .

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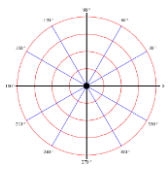
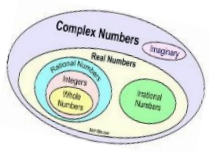
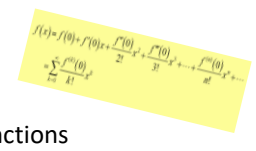
Polar Coordinates:
- Converting between Cartesian and polar form
- Sketching curves in polar form .



MacLaurin Series:
- Polynomial approximations
- Maclaurin series for standard functions.

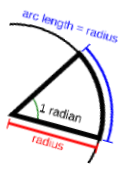
Complex Numbers 2:
- Modulus-argument form
- Multiplying and dividing complex numbers
- Loci in argand diagrams



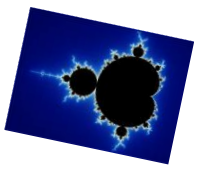


Rational Functions:
- Graphs of rational functions
- Inequalities

Radians:
- Converting between degrees and radians
- Solving equations in radian form



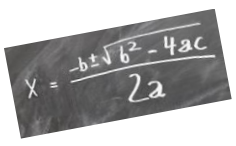
Roots and Polynomials:
- Polynomials
- Cubic equations
- Quartic equations

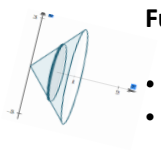


Proof:
- Proof by induction of functions
- Proof by induction of matrices.

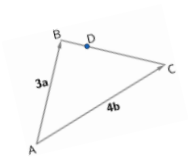
Hyperbolic Functions 2:
- Identities involving hyperbolic functions
- Logarithmic form of hyperbolic functions.

Hyperbolic Functions:
- Definitions of sinh, cosh and tanh
- Differentiate hyperbolic functions
- Inverse hyperbolic functions.

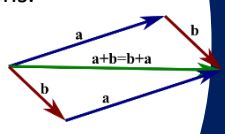


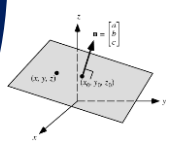


Further Vectors:
- Vectors recap
- Scaler Product
- Equation of a vector line.



Further Vectors 2:
- Equation of a plane
- Vector Product
- Intersections of lines and planes

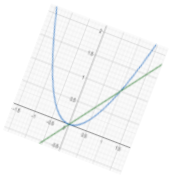




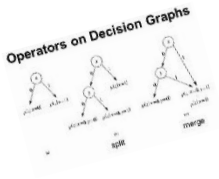
Further Algebra and Functions
- Volumes of revolution
- Mean value of a function .

Network Flows:
- Maximum flow/Minimum cut
- Multiple sources and sinks
- Flow argument

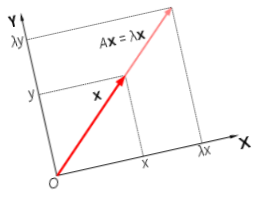
Complex Numbers
- Extending the number system
- Division of complex numbers
- Representing complex numbers geometrically



Networks
- Minimum Connector Problem
- Route Inspection Problem
- Travelling Salesman Problem .



Graphs:
- Eulerian, Hamilton and Planar Graphs
- Isomorphisms
- Kuratowski's Theorem .



Teacher B

Teacher A

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Eigenvectors and Eigenvalues:
- Calculating eigenvalues and eigenvectors
- Diagonalisation of matrices
- Factorising the determinant

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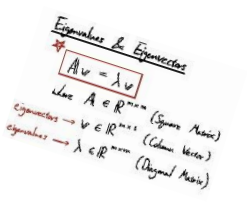
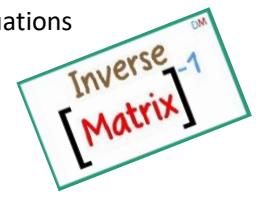


Matrices 3 x 3
- Determinants and inverse of 3x3 matrices
- Systems of linear simultaneous equations



Matrices 2 x 2 :
- Matrix arithmetic
- Determinants of 2x2 matrices
- Linear transformations
- Invariant points and lines