



Lanark Grammar School Mathematics Department

Higher Mathematics Course Outline

Content	Suggested Resource Higher Topic Workbook	Video
Straight Line (10 Periods)		
Gradients/ $m = \tan\theta$	Straight Line	https://youtu.be/wmbGXxEEe8Q
Collinearity	Straight Line	https://youtu.be/Xtfl8MnWrho
Prependicular Gradients	Straight Line	https://youtu.be/CSYmWs0LXgl
$y = mx + c$ and General Equation	Straight Line	https://youtu.be/TZA7C812dX8
Perpendicular Bisectors	Straight Line	https://youtu.be/HJVUdOz3ovA
Altitudes	Straight Line	https://youtu.be/phgK8L-u6DY
Medians	Straight Line	https://youtu.be/jRyiuZxQt3w
Distance Formula (Ex 12B P211)	Straight Line	https://youtu.be/DXe0rBsM7Aw
Intersecting Lines in Triangles	Straight Line	https://youtu.be/aZ0dvz20Fi4
Graphs of Functions (5 Periods)		
Standard graphs & $y = f(x) + a$	Functions and Graphs	https://corbettmaths.com/2016/08/07/transformations-of-graphs/
$y = f(x+/-a)$	Functions and Graphs	https://youtu.be/-xZ3BAIFbUg
$y = -f(x)$ & $y = f(-x)$	Functions and Graphs	
$y = kf(x)$ and $y = f(kx)$	Functions and Graphs	
Combined Graphs	Functions and Graphs	
Summer Break		
Trig Graphs & Equations (7 Periods)		
Trig graph revision -period & amplitude	Trigonometry	https://corbettmaths.com/2013/04/20/ysin-x-graph/
		https://corbettmaths.com/2013/05/07/cosine-graph/
		https://corbettmaths.com/2013/05/12/tangent-graph/
Sketching Graphs	Trigonometry	
Radians	Trigonometry	https://youtu.be/VSGJOoxEWI4
Exact Values	Trigonometry	https://youtu.be/Fj0PdjdiT1I
Algebraic Solution of Equations	Trigonometry	https://youtu.be/iEAjaPugO-I

Algebraic solution of Compound Equations	Trigonometry	
Double Angle Formulae Ex 11G, 11H, 11I	Trigonometry	
Quadratics (6 Periods)		
Completing the Square and Turning Points	Polynomials & Quadratics	https://youtu.be/iiWZiXXickI
Solving Equations by Completing the Square	Polynomials & Quadratics	https://corbettmaths.com/2013/12/29/completing-the-square-video-10/
Quadratic Inequations	Polynomials & Quadratics	https://youtu.be/2bek21yeVbc
Discriminant and Roots revision	Polynomials & Quadratics	https://youtu.be/lb4u4gD1uWA
Using the Discriminant	Polynomials & Quadratics	https://youtu.be/BNBz-J0XFAA
Condition for Tangency	Polynomials & Quadratics	https://youtu.be/Dt9w1tL75pY
Polynomials (8 Periods)		
Synthetic Division	Polynomials & Quadratics	https://youtu.be/0yf6rlosGwI
Remainder & Factor theorem	Polynomials & Quadratics	https://youtu.be/faxt5Abket8
Finding a Polynomial's Coefficients	Polynomials & Quadratics	https://youtu.be/h5Nz9Rd2e-s
Solving Polynomial Equations	Polynomials & Quadratics	https://youtu.be/JzV9rCSva6g
Functions from Graphs		https://youtu.be/p0ySbgcKYY8
September Weekend		
Differentiation (11 Periods)		
Derivative of x^n	Differentiation	https://youtu.be/-9nYDRpEZgQ
Rate of Change	Differentiation	
Derivative of ax^n including fractional indices	Differentiation	https://youtu.be/mm0FGRSIUeM
Products & Quotients	Differentiation	https://youtu.be/iGaV-pAWL5Q
Applications of Derivatives	Differentiation	https://youtu.be/5Q7fmI0fIBU
Leibniz Notation	Differentiation	https://youtu.be/685iPsxYhGo
Equations of Tangents	Differentiation	https://youtu.be/OdJNAyZggZc
Increasing & Decreasing Functions	Differentiation	https://youtu.be/BadaRe7U-fl
Stationary Points	Differentiation	https://youtu.be/oKmBXD4K5TA
Sets & Functions (4 Periods)		

Set Notation	Functions and Graphs	https://youtu.be/tCbEaJotJpI
Functions & Mappings	Functions and Graphs	
Composite Functions	Functions and Graphs	https://youtu.be/Mbem2NMdPhM
Inverse Functions	Functions and Graphs	https://youtu.be/JSCCYCMLuQg
Graphs of Inverses	Functions and Graphs	
Flexible Time/Revision		
October Break		
Assessment 1 (A/B Test Paper 1 & 2)		
Circle (8 Periods)		
Distance Formula (Ex 12B P211)	Circle	
Equation of a Circle, centre the origin and radius r	Circle	https://youtu.be/vv1H5ouR5hE
Equation of a Circle, centre (a,b) and radius r	Circle	
Expanded Form of the Equation of a Circle	Circle	
General Equation of a Circle	Circle	https://youtu.be/cHLftT3v7Kc
Intersection of a Line and a Circle	Circle	https://youtu.be/iMA8YjsqY4M
Tangents to Circles	Circle	https://youtu.be/og7anTgC1ak
Equations of Tangents	Circle	
Intersection of Circles	Circle	https://youtu.be/T8i1e5uqhTI
S4-6 Parents Evening		
Further Differentiation (Curve Sketching & Optimisation) (5 Periods)		
Curve Sketching (see P147 for synthetic division examples)	Applications of Calculus	https://youtu.be/lafYTeO2wqM
Closed Intervals	Applications of Calculus	https://youtu.be/5BSMS_8I1TE
Derived Graph	Applications of Calculus	https://youtu.be/3K3VJOuHq2A
Optimisation	Applications of Calculus	https://youtu.be/1Xm5OwgHKc8
S4-6 Parents Evening		
Addition Formula (4 Periods)		
Formulae for $\sin(\alpha + \beta)$	Trigonometry	https://youtu.be/eMngvOg5fek

Formulae for $\sin(\alpha - \beta)$	Trigonometry	
Formulae for $\cos(\alpha \pm \beta)$	Trigonometry	
Trigonometric Identities	Trigonometry	https://youtu.be/JftKDFqw6lg
Double Angle Formulae (4 Periods)		
Formulae Involving 2α	Trigonometry	https://youtu.be/cYmenAnUfvI
Trigonometric Equations	Trigonometry	https://youtu.be/AmFFjkSy2sl
Formulae for $\cos^2 x$ and $\sin^2 x$	Trigonometry	
Integration (9 Periods)		
Anti-Derivative	Integration	https://youtu.be/dUxJpR4MNIU
Indefinite Integrals	Integration	
Rules of Integration	Integration	
Further Integrals	Integration	https://youtu.be/Mf_8iBUbd1c
Definite Integrals	Integration	https://youtu.be/6kjinxJYtVQU
Evaluating Definite Integrals	Integration	
Areas above and below the x-axis	Applications of Calculus	https://youtu.be/LxdL3MmP3zc
Area between two Graphs	Applications of Calculus	https://youtu.be/IEp5jFChWPs
S4-6 Parents Evening		
Assessment 2 (A/B Test Paper 1 & 2)		
Recurrence Relations (6 Periods)		
Introduction & Using RR to solve problems	Recurrence Relations	https://youtu.be/RJEiDMZs97U
More Complex Recurrence Relations	Recurrence Relations	
Linear Recurrence Relations	Recurrence Relations	
Limit of a Recurrence Relation	Recurrence Relations	https://youtu.be/tINv6uRF4yo
Solving Recurrence Relations to find a and b	Recurrence Relations	https://youtu.be/tfu8rwZF35E
Further Calculus (incl. Diff of Trig) (10 Periods)		
Derivative of $\sin x$ and $\cos x$	Differentiation	https://youtu.be/CpbXZbIHYE0
Derivative of $(x + b)^n$ & $(ax + b)^n$	Differentiation	https://youtu.be/FcNZOf_r6qc
Applications	Applications of Calculus	

Integrating $(ax + b)^n$	Integration	https://youtu.be/QspRBGeZ45M
Integration of Sin x and Cos x (including area calculations)	Integration	https://youtu.be/_rfi4GfNXQU
Integrating sin (ax + b) and cos (ax + b)	Integration	
Differential Equations	Integration	https://youtu.be/A87x1C4zxc4
Christmas Break		
Flexible Time/Revision		
January Prelim		
S4-6 Full Reports		
February Break		
Exp & Log Functions (8 Periods)		
Introduction and Exponential Growth & Decay Graphs	Logs & Exponentials	https://youtu.be/1NAy4CttF-w
Logarithms	Logs & Exponentials	https://youtu.be/pQfgzzLL6KM
Laws of Logarithms	Logs & Exponentials	https://youtu.be/HRtUKa4m0LM
Logarithmic Equations	Logs & Exponentials	
Natural Logarithms	Logs & Exponentials	https://youtu.be/jXQp0jBGKa0
Sketching Related Graphs(Ex 15K, Ex 3N)	Logs & Exponentials	https://youtu.be/Jcl0uAYS4wM
Determining the Equation of Related Graphs(Ex 3N, 3O, 15K)	Logs & Exponentials	
Vectors (9 Periods)		
Multiplication by a Scalar	Vectors	https://youtu.be/5s-MVDBCKZs
Unit Vectors	Vectors	https://youtu.be/cHlkEq8Gf5Y
Position Vectors	Vectors	https://youtu.be/b7kANGjeCPQ
Collinearity	Vectors	https://youtu.be/aHEZh-P3bDc
Section Formula	Vectors	https://youtu.be/pQqwggyUe_M
l, j and k component form	Vectors	
Scalar Product	Vectors	https://youtu.be/7z6EISLQq-0
Component Form of Scalar Product	Vectors	https://youtu.be/N6Rn3z95qTg
Angle between Vectors	Vectors	https://youtu.be/gv8xY63TRFY

Perpendicular Vectors	Vectors	https://youtu.be/0JOTnBGbUCY
Applications	Vectors	
Properties of the Scalar Product	Vectors	https://youtu.be/mAkgaRNrBF4
Wave Function (8 Periods)		
Add function in the Form $k\cos(x - \alpha)$	Trigonometry	https://youtu.be/SKTGI3pjKYc
Subtract function in the form $k\cos(x - \alpha)$	Trigonometry	https://youtu.be/ogt7aCPSHsY
Other Forms of the Wave Function	Trigonometry	
Multiple Angles	Trigonometry	https://youtu.be/OPp4vt2WaZ4
Maximum and Minimum Values	Trigonometry	https://youtu.be/v0izLhkrQEE
Solving Equations	Trigonometry	https://youtu.be/F8L0mVlas9E
Applications	Trigonometry	https://youtu.be/Zop82bLLvZ8
Exp & Log Functions - Experimental Data (2 Periods)		
Formulae from Experimental Data	Logs & Exponentials	https://youtu.be/-OYsH4ILUoM
Spring Break		
Final Supplementary Prelim		
Flexible Time/Revision		
S5/6 Study Leave Begins		
SQA Higher Exam		