

Scottish Curriculum

Topics that can be usefully taught using Autograph 5

SQA: National 5 Mathematics

SQA: Higher Mathematics

SQA: Advanced higher Mathematics

SQA: Higher Applications of Mathematics

**Autograph 5 is free for all to download from the
Complete Maths link:**

www.completemaths.com/autograph

Scotland (SQA): TOPICS FOR AUTOGRAPH

National 5 Mathematics

“[N5-course-Spec-Mathematics.pdf](#)”

Algebraic skills

Linear equations:

- Straight Line: $y-b=m(x-a)$
- Gradient; intercept
- Linear inequalities
- Simultaneous equations

Completing the Square:

$$x^2+bx+c \Rightarrow (x+p)^2+q$$

Graphs:

$$y = kx^2; y = k(x+p)^2 + q; y=(ax-m)(bx-n)$$

Quadratic:

- turning point; axis of symmetry
- Roots; quadratic formula; discriminant

Geometric skills

Two points:

$$m = (y_2-y_1)/(x_2-x_1)$$

Circle:

- length of arc; area of sector

Volume:

- sphere, cone, pyramid

Pythagoras in 2D and 3D

Quadrilaterals, triangles, polygons, circles

Circle properties

Vectors in 2D and 3D:

- add, subtract; magnitude

Trigonometric skills

Trig graphs:

- amplitude, phase angle; Period

$$\cos^2x + \sin^2x = 1; \tan x = \sin x/\cos x$$

Statistical skills

Data:

- Inter-Quartile Range, Standard Deviation

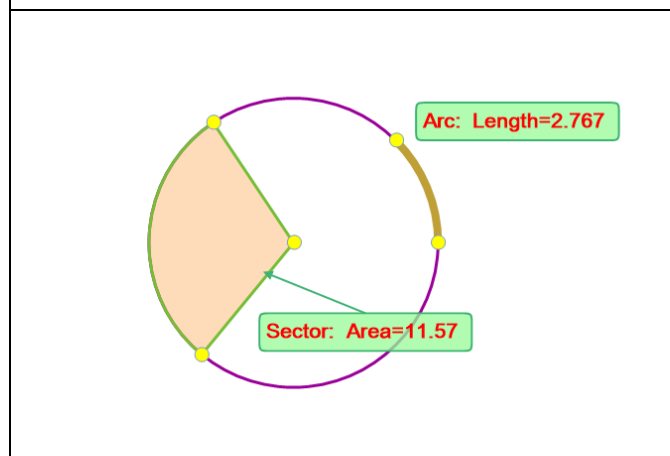
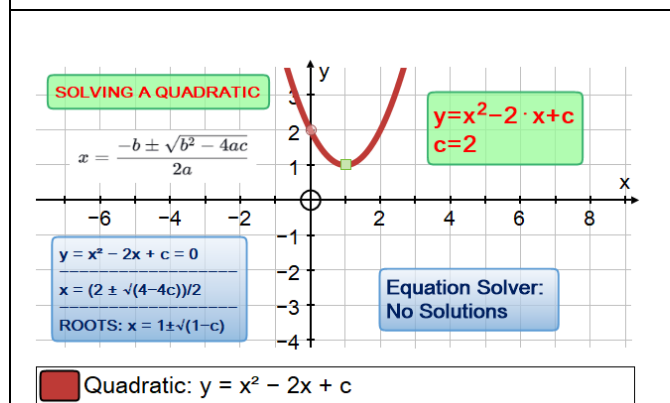
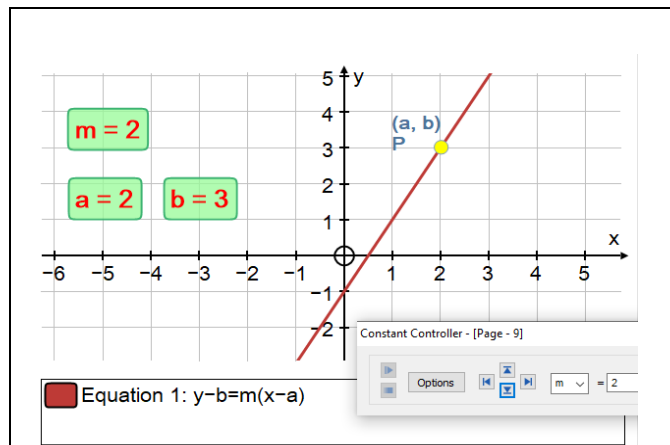
Scattergraph:

- best-fitting straight line

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Autograph Resources: www.tsm-resources.com

Data, images, links, etc



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Higher Mathematics

“[Higher Course Spec Mathematics.pdf](#)”

Algebraic and Trigonometric skills

Factorising cubic or quartic polynomials

Trig: addition and double angle formulae

$a\cos x + b\sin x \Rightarrow k\cos(x \pm \alpha)$ or $k\sin(x \pm \alpha)$

Transformation of graphs:

$kf(x)$, $f(kx)$, $f(x) + k$, $f(x+k)$

Sketching 1st derivative; $f'(x)$ from $f(x)$

Completing the square:

$ax^2 + bx + c \Rightarrow a(x+p)^2 + q$

Composite and inverse functions

$f(x)$, $g(x)$, $f(g(x))$; $f^{-1}(x)$

Quadratic inequalities

Logarithmic and exponential functions

Reduction to linear form from $y = ax^b$ or $y = ab^x$

Simultaneous linear/non-linear or 2 non-linear

Trig graphs in degrees and radians

Vectors in 2D and 3D: subdivision

Scalar product; angle between two vectors

Calculus Skills

Differentiating:

powers of x , $k\sin x$, $k\cos x$

Equation of tangent

Sketching curves, stationary points

Integrating:

powers of x , $p\sin x$, $(px+q)^n$

Definite integrals, area under curve

$\cos^2 x = (1 + \cos 2x)/2$; $\sin^2 x = (1 - \cos 2x)/2$

Differential Equations: $dy/dx = f(x)$

Area between two curves

Algebraic and geometric skills

Parallel and perpendicular lines

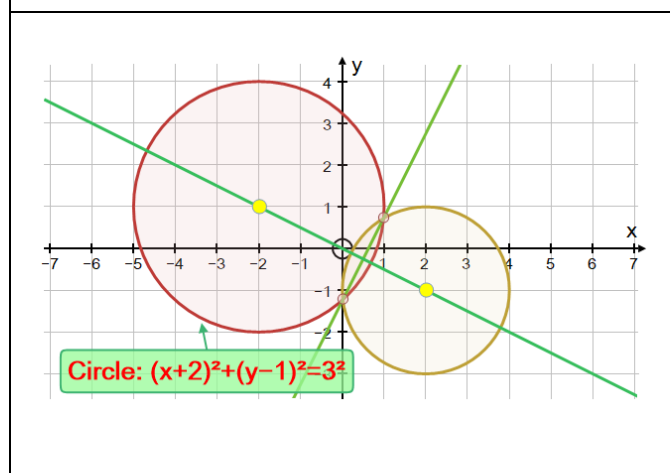
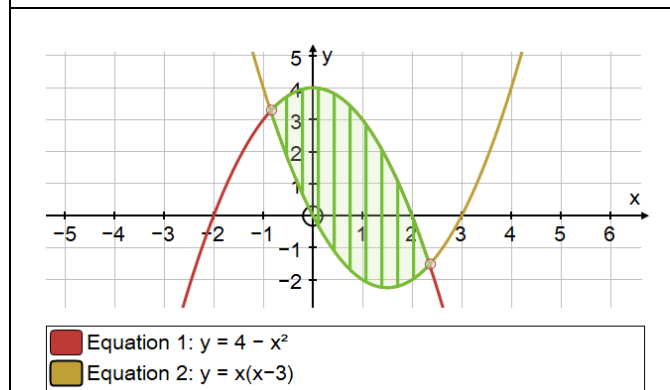
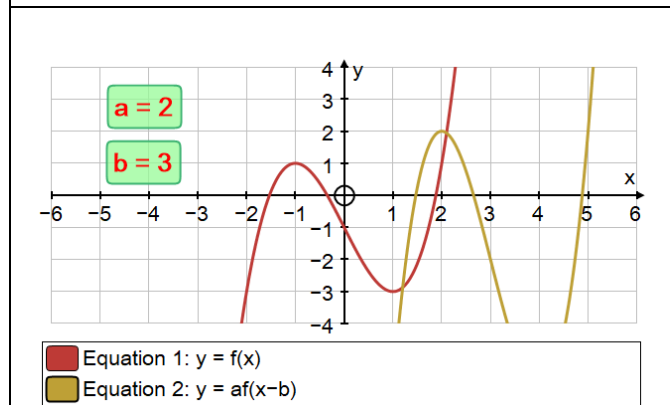
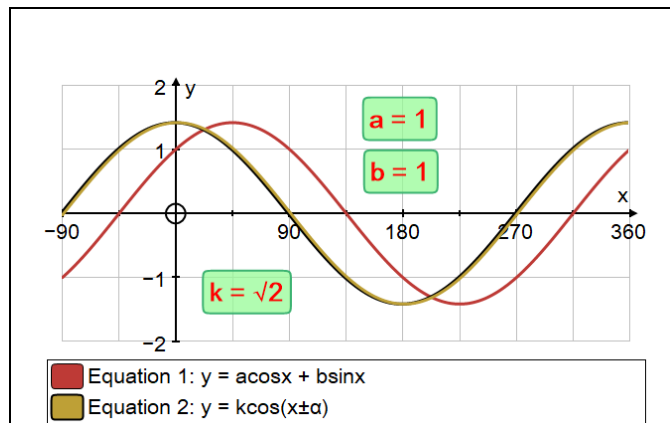
Equation of a circle

Intersection of circles, circle and line

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Advanced Higher Mathematics

["AHCourseSpecMathematics.pdf"](#)

Calculus skills

Differentiating e^x and $\ln x$

Inverse trig functions

Implicit differentiation

Second derivative

Differentiating parametric functions

Integration:

volumes of revolution about either axis

Area to either axis

1st Order Differential Equations

$dy/dx = g(x)h(y)$

$dy/dx = g(x)/h(y)$

$dy/dx + P(x) = f(x)$

2nd Order Differential Equations

$ay'' + by' + cy = f(x)$

Discriminant of auxiliary equation

Algebra skills

Graphing:

finding asymptotes

Points of inflection; stationary points

Domain and range

Modulus function

Inverse function

Translations and reflections

Maclaurin expansion

Matrix skills

Transformations

Rotation, reflection. Dilation; combinations

Vector skills (3D)

Scalar triple product

3D lines: angle between two lines/intersect

Vector equation of a plane

Intersection of a line and plane

Intersection of 2 or 3 planes

Angle between line and plane

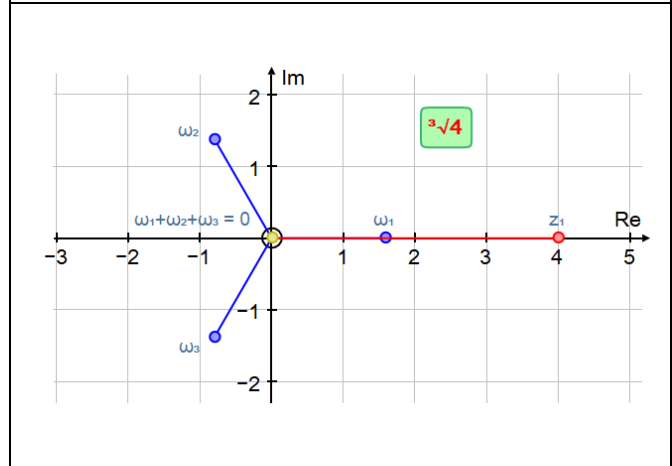
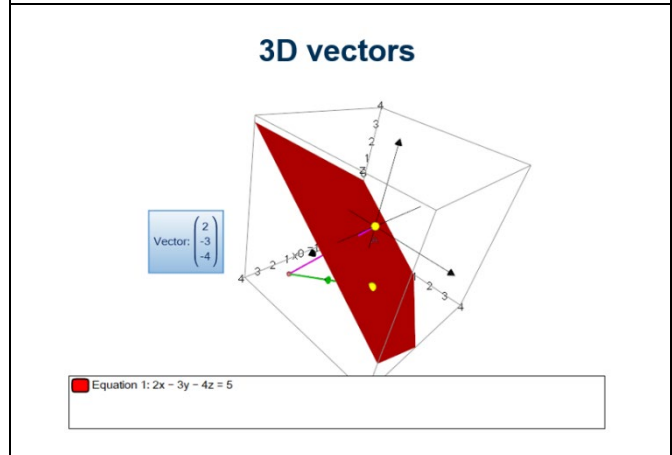
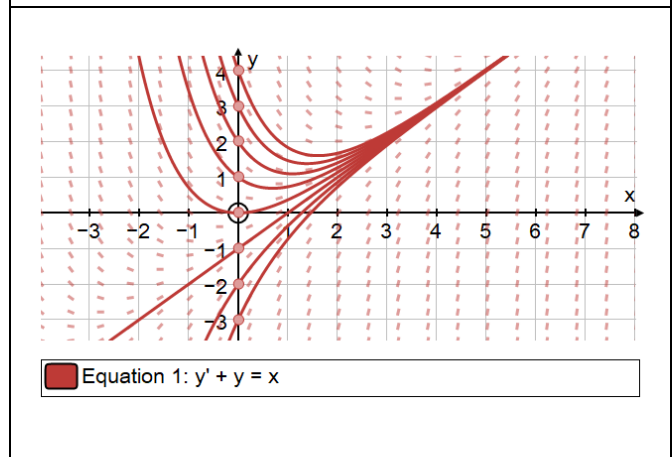
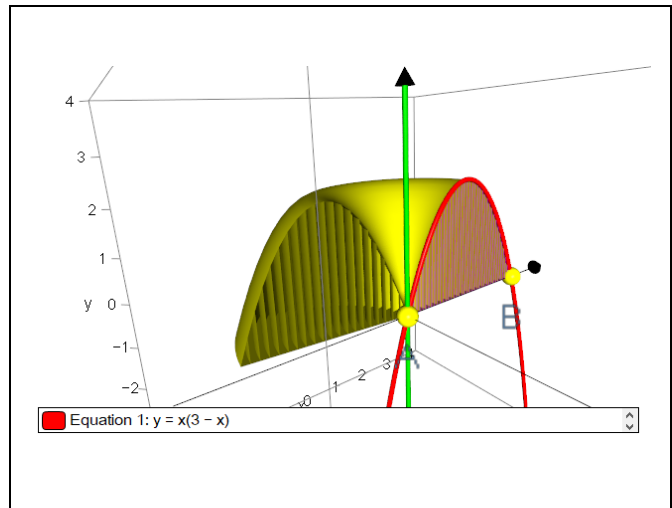
Angle between 2 planes

Complex Number skills

Add, subtract, multiply, divide; square root

Argand diagram; modulus and argument

De Moivre's theorem; nth root; Locus



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Higher Applications of Mathematics

https://www.sqa.org.uk/files_ccc/higher-course-spec-applications-of-mathematics.pdf

Mathematical Modelling

Graphs and charts
Using software effectively
Editing and sorting data

Statistics and Probability

Types of data
Populations and samples
Outliers

Stem-and-leaf diagrams
Box Plots

Frequency tables
Histograms

Symmetry, normality, skewness
Mean, median, Inter-quartile range

Correlation and linear regression
Scatter plots
Pearson's PMCC

Seasonality

Normal distribution
Hypothesis test
Confidence intervals

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