

» Mathematics Program Summary | Year 10 Course

» TOPIC 1: ALGEBRA REVISION	
Substitute into: expressions	
function notation	
formulae	
Construct formulae & expressions	
Change subject	
Expand expressions	
Factorise: common factors	
difference of squares	
difference of cubes	
by grouping pairs	
quadratics	
Simplify algebraic fractions	
Solve quadratics: by factorising	
by quadratic formula	
by completing the \square	
Reduce equations to quadratics	
Solve simultaneous equations	
Simplify surds	
Solve equations with surds	
Simplify: using index laws	
negative indices	
fractional indices	
Solve indicial equations	
» TOPICS 2 & 5: GEOMETRY REVISION	
Use angle properties in proofs	
Test for congruent triangles: SSS	
SAS	
AAS	
RHS	
Test for similar triangles: eq. side ratios	
equiangularity	
2 pairs of sides	
in ratio and included angle is equal	
right-angled Δ	
with hypotenuse & other side in ratio	
Calculate sides in similar triangles	
Prove that interval joining midpoints of two sides of a triangle is half the length and parallel to the third side	
Prove that a line parallel to one side of a triangle divides the other two sides in the same ratio	
Prove that intercepts made by parallel lines on a set of transversals are in the same ratio, but converse is not true	
Use quadrilateral properties	
Use Pythagoras' theorem	
» TOPIC 3: CO-ORDINATE GEOMETRY	
Calculate: distance, midpoint, gradient	
Interpret line forms: gradient-intercept	
point-gradient	
intercept	
two-point	
general	
State conditions for: given point on line	
parallel lines	
perpendicular lines	
k -method for finding equation of a line concurrent with two other lines	
Calculate angle between line and x -axis	
Sketching (shading) regions	
Calculate perpendicular distance between a point and a line	
Ratio division: internal	
external	
Write down equation of circle given centre and radius	
Find centre and radius of circle when given its equation	
Find the points where a straight line and a curve (e.g. parabola, cubic) intersect	
Test if a line is tangent to a circle	

» TOPIC 4: VARIATION	
State condition for two quantities to vary directly	
Draw a graph of direct variation	
State condition for two quantities to vary indirectly	
Draw a graph of indirect variation	
Predict the effect of changing a quantity that varies as another quantity	
State condition for a quantity to vary as a power of another	
» TOPIC 6: TRIGONOMETRY	
Find sides and angles in right-angled Δ	
Write exact values for all trigonometric ratios for $0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90° .	
Solve: worded problems	
problems with bearings	
problems in three dimensions	
Find angles of inclination & depression	
Understand relationship between the trigonometric functions & the unit circle	
Evaluate trig. functions exactly	
For trigonometric functions:	
graph	
state domain and range	
state amplitude and period	
Solve trig. equations in a given domain	
Find angles & sides by: using sine rule	
using cosine rule	
Recognise ambiguity of sine rule	
Find area of triangle using trigonometry	
» TOPIC 7: CIRCLE GEOMETRY	
Equal chords subtend equal angles at the centre	
Equal chords subtend equal angles at the circumference	
Equal chords are equidistant from the centre	
The perpendicular from the centre to a chord bisects the chord	
The bisector from the centre to a chord is perpendicular to the chord	
The perpendicular bisector of a chord passes through the centre	
When two circles intersect, their common chord is perpendicular to the interval between their centres	
The angle at the centre is twice the angle at the circumf. on the same arc	
The angle in a semicircle is a right angle	
Angles standing on the same arc are equal	
Opposite angles in a cyclic quadrilateral are supplementary	
If the opposite angles of a quadrilateral are supplementary, it is cyclic	
The exterior angle of a cyclic quadrilateral is equal to the opposite interior angle	
A tangent is perpendicular to the radius drawn from its point of contact	
Angle in the alternate segment	
Two tangents drawn to a circle from a point are equal	
When two circles touch, their centres and point of contact are collinear	
The products of intercepts on intersecting chords are equal	
The products of intercepts on secants from a point are equal	
Square of intercept on tangent equals product of intercepts on secant	
Able to use the circle properties above in geometry proofs	

» TOPIC 8: PROBABILITY REVISION	
Understand sample space	
Use dot diagrams to represent sample space for 2-stage events	
Use tree diagrams to represent multiple-stage events	
Use probability tree diagrams to represent events with varying chances	
Solve problems with:	
conditional probability	
complementary events	
» TOPICS 9 & 10: GRAPHING	
Sketch: straight lines	
parabolas	
polynomials	
circles	
semi-circles	
hyperbolas	
exponentials	
by plotting points	
shifted functions	
Find and graph: vertical asymptotes	
horizontal asymptotes	
oblique asymptotes	
Sketch graphs involving:	
addition of functions	
subtraction of functions	
multiplication of functions	
division of functions	
Describe domain & range of functions	
» TOPIC 11: TRIG. EQNS & IDENTITIES	
Use the reciprocal functions	
Graph the reciprocal functions	
Derive the Pythagorean relationships:	
$\sin^2 x + \cos^2 x = 1$	
$1 + \tan^2 x = \sec^2 x$	
$1 + \cot^2 x = \operatorname{cosec}^2 x$	
Simplify trigonometric expressions	
Prove trigonometric identities	
Solve quadratic trigonometric equations in terms of one trigonometric function	
Solve quadratic trigonometric equations in terms of multiple trig. functions	

All these topics are tested in the yearly exam.

The following topics are (usually) covered after the yearly, and then tested separately:

- Quadratic Theory
- Logarithms
- Radian Measure
- Absolute Values

For more details, please see the full mathematics program, available for download on the school intranet.