

KS4 Year 10 Group D

Subject: Mathematics

The mathematics department aim to develop the full potential of every student in the subject. It is our aim to ensure that every pupil experiences success and enjoyment in the subject, whether it be equipping them with sufficient mathematical skills for everyday life or developing problem solving and reasoning skills to take them beyond GCSE.

The scheme of learning is divided into units of study consisting of interlinking skills and topics that build on prior learning. Throughout the year students will complete multi-choice quizzes, homework, 'common homework tasks' and assessments. The common homework tasks will be completed by all students following this scheme of learning. The assessments provide opportunities for students to demonstrate their ability to recall information, methods of calculation and skills studied in previous units of work, and apply their problem solving skills to a variety of contextual problems.

	I will learn to	How I will be assessed
Autumn Term	Unit 1 <ul style="list-style-type: none"> • Know the difference between an equation and an identity • Argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments • Simplify and manipulate algebraic expressions by expanding products of two binomials • Factorise quadratic expressions of the form $x^2 + bx + c$ including the difference of 2 squares • Solve quadratic equations by factorising • Solve quadratic equations graphically • Identify and interpret roots, intercepts, turning points of quadratic functions graphically; deduce roots algebraically 	Multi-choice Quiz Common Homework Topic Assessment
	Unit 2 <ul style="list-style-type: none"> • Calculate arc lengths, angles and areas of sectors of circles (including giving answers in terms of π) • Working backwards to find the radius/diameter given the area or arc length • Understand, recall and use Pythagoras' Theorem in 2D problems • Calculate the volume of cylinders, spheres, pyramids, cones and composite solids (include working backwards to find the radius/diameter) • Calculate the surface area of cylinders, spheres, pyramids, cones and composite solids (include working backwards to find the radius/diameter) 	Multi-choice Quiz Common Homework Topic Assessment
	Unit 3 <ul style="list-style-type: none"> • Understand and use the concepts and vocabulary of expressions, terms, equations, factors, identity, inequalities and formulae • Solve linear inequalities in one variable and represent the solution set on a number line • Solve two linear simultaneous equations in two variables algebraically (elimination and substitution) • Solve two linear simultaneous equations in two variables graphically. • Form and solve two linear simultaneous equations 	Multi-choice Quiz Common Homework Autumn Assessment (Units 1-3)

	Unit 4	<ul style="list-style-type: none"> Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions Know different types of sampling including random, systematic and stratified sampling (please note questions may not explicitly use the phrase 'stratified sample') Know the advantages and disadvantages of different sampling methods including bias Construct and interpret frequency tables and bar charts for grouped continuous data Calculate an estimate of the mean, the interval containing the median and modal class for a grouped frequency table Apply statistics to describe a population, using measures of central tendency and measures of dispersion 	Multi-choice Quiz Common Homework Topic Assessment
Spring Term	Unit 5	<ul style="list-style-type: none"> Understand congruence and identify shapes that are congruent. Understand and use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS) Understand similarity of triangles and of other plane figures and identify shapes that are similar including all squares, all circles or all regular polygons with equal number of sides Apply the concepts of similarity including the relationships between lengths, areas and volumes in similar figures Understand, recall and use trigonometric relationships in right-angled triangles, including problems involving bearings Concept of surds [all except Year 11 to introduce surds] Know the exact values of $\sin x$ and $\cos x$ for $x=0, 30, 45, 60$ and 90 and know the exact value of $\tan x$ for $x=0, 30, 45$ and 60 	Multi-choice Quiz Common Homework Spring Assessment (Units 1-5)
Summer Term	Unit 6	<ul style="list-style-type: none"> Draw, sketch, recognise and interpret quadratic graphs, simple cubic graphs and the reciprocal function Interpret the gradient of a straight line graph as a rate of change Plot and interpret real life graphs graphs (including reciprocal and non-standard function) such as simple kinematic problems involving distance, speed and acceleration: time series data, filling a water jug, a plumbers call out charge and hourly rate Set up, solve and interpret answers in growth and decay problems Calculate problems which involve simple/compound interest Solve percentage problems involving finding the original value Understand that an equation of the form $y = kx$ represents direct proportion and the k is the constant of proportionality. (Include $x^2, x^3, \sqrt{x}, \sqrt[3]{x}$) Understand that an equation of the form $y = k/x$ represents inverse proportion and that k is the constant of proportionality (Include $x^2, x^3, \sqrt{x}, \sqrt[3]{x}$) 	Multi-choice Quiz Common Homework Topic Assessment
	Unit 7	<ul style="list-style-type: none"> Use the fact that the tangent at any point on a circle is perpendicular to the radius at that point Use the fact that tangents from an external point are equal in length Use the fact that the perpendicular from the centre to a chord bisects the chord Use the fact that the angle subtended by an arc at the centre of a circle is twice the angle subtended at any point on the circumference Use the fact that the angle subtended at the circumference by a semicircle is a right angle Use the fact that angles in the same segment are equal Use the fact that opposite angles of a cyclic quadrilateral sum to 180° Use the alternate segment theorem 	Multi-choice quiz Recall homework

	Unit 8	<ul style="list-style-type: none"> • expand products of three binomials • solve quadratic equations by completing the square • solve quadratic equations by using the quadratic formula • factorise quadratics expressions where coefficient of $x^2 > 1$ • Form and solve quadratic equations including those that require rearrangement • Know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments and proofs 	<p>Multi-choice quiz</p> <p>Common Homework</p> <p>End of year assessment (Units 1-7 & part of 8)</p>
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How you can support your child's progress in mathematics:

- Encourage independence in repeated practice of unfamiliar topics using vle.mathswatch.co.uk/vle
- Practise mental maths skills such as addition, subtraction, multiplication and division regularly.
- Provide real life opportunities to challenge your child's mathematical knowledge and skills. Examples could include; calculating change from a bill, estimating the cost of a restaurant bill, working out the best buy when shopping, working out the cost of a home improvement or the amount of supplies for a home improvement.
- Encourage the use of appropriate mathematics websites such as Nrich or Mathsgenie for 'rich' tasks and exam style questions.