Marshalls Park Academy - Curriculum Overview

Subject: Mathematics   Year Group: 11 Foundation

In Year 11, Students study the final content of the three year GCSE Mathematics curriculum and prepare for the GCSE.

The aim of the curriculum is to become fluent in the fundamentals of mathematics, reason mathematically and solve problems.

TERM 1	TERM 2	TERM 3
CONTENT/SKILLS	CONTENT/SKILLS	CONTENT/SKILLS

Quadratic equations and graphs

- simplify and manipulate algebraic expressions by: expanding products of two binomials; factorising quadratic expressions of the form $x^2 + bx + c$, including the difference of two squares
- identify and interpret roots, intercepts, turning points of quadratic functions graphically; deduce roots algebraically
- recognise, sketch and interpret graphs of quadratic functions
- plot and interpret graphs (including reciprocal graphs) and graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration

Congruence, similarity and vectors

- express a multiplicative relationship between two quantities as a ratio or a fraction
- compare lengths, areas and volumes using ratio notation; make links to similarity (including trigonometric ratios) and scale factors
- use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)
- apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides and use known results to obtain simple proofs
- identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement

GCSE Maths revision

- solve quadratic equations algebraically by factorising; find approximate solutions using a graph

Perimeter, area and volume 2

- calculate exactly with multiples of π
- estimate answers; check calculations using approximation and estimation, including answers obtained using technology
- round numbers and measures to an appropriate degree of accuracy
- understand and use standard mathematical formulae; rearrange formulae to change the subject
- identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment
- know and apply formulae to calculate: area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders)
- know the formulae: circumference of a circle = $2\pi r = \pi d$, area of a circle = πr^2; calculate: perimeters of 2D shapes, including circles; areas of circles and composite shapes; surface area and

- apply the concepts of congruence and similarity, including the relationships between lengths in similar figures
- describe translations as 2D vectors
- apply addition and subtraction of vectors, multiplication by vectors by a scalar, and diagrammatic and column representations of vectors

More algebra

- order positive and negative integers, decimals and fractions; use the symbols =, ≠, <, >, ≤, ≥
- understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors
- understand and use standard mathematical formulae; rearrange formulae to change the subject
- argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments
- use the form $y = mx + c$ to identify parallel lines; find the equation of the line through two given points, or through one point with a given gradient
- identify and interpret gradients and intercepts of linear functions graphically and algebraically

- volume of spheres, pyramids, cones and composite solids
- calculate arc lengths, angles and areas of sectors of circles

Fractions, indices and standard form

- apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative; understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals)
- recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions); use conventional notation for priority of operations, including brackets, powers, roots and reciprocals
- calculate with roots, and with integer indices
- calculate exactly with fractions
- calculate with and interpret standard form $A \times 10^{n}$, where $1 \leq A < 10$ and n is an integer.

- recognise, sketch and interpret graphs of the reciprocal function $y = -\frac{1}{x}$ with $x \neq 0$
- plot and interpret reciprocal graphs
- solve two simultaneous equations in two variables (linear/linear) algebraically; find approximate solutions using a graph
- translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution.
- solve problems involving direct and inverse proportion, including graphical and algebraic representations

KEY ASSESSMENTS	KEY ASSESSMENTS	KEY ASSESSMENTS
HALF TERM 1	HALF TERM 3	HALF TERM 5 GCSE papers
HALF TERM 2 PPEs	HALF TERM 4 PPEs	HALF TERM 6 GCSE papers

Students have access to Mathswatch revision resources and supporting video clips https://vle.mathswatch.co.uk/vle/

Edexcel Maths GCSE Foundation revision guides are available to support learning.

Students can obtain further revision resources from www.mathsgenie.co.uk and www.corbettmaths.com