



Marshall's Park Academy - Curriculum Overview

Subject: Mathematics

Year Group: 10 Foundation



In Year 10, Students study the second year of a three year GCSE Mathematics curriculum.

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
<p style="text-align: center;">CONTENT/SKILLS</p> <p>Perimeter, area and volume</p> <ul style="list-style-type: none"> estimate answers; check calculations using approximation and estimation, including answers obtained using technology understand and use standard mathematical formulae change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts solve geometrical problems on coordinate axes identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.) measure line segments and angles in geometric figures know and apply formulae to calculate: area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders) 	<p style="text-align: center;">CONTENT/SKILLS</p> <p>Ratio and proportion</p> <ul style="list-style-type: none"> identify and work with fractions in ratio problems use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts use scale factors, scale diagrams and maps express one quantity as a fraction of another use ratio notation, including reduction to simplest form divide a given quantity into two parts in a given part : part or part : whole ratio; express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems express a multiplicative relationship between two quantities as a ratio or a fraction understand and use proportion as equality of ratios relate ratios to fractions and to linear functions 	<p style="text-align: center;">CONTENT/SKILLS</p> <p>Probability</p> <ul style="list-style-type: none"> apply systematic listing strategies record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments relate relative expected frequencies to theoretical probability, using appropriate language and the 0-1 probability scale apply the property that the probabilities of an exhaustive set of outcomes sum to one; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams and tree diagrams construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities



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- calculate: perimeters of 2D shapes, including composite shapes

Graphs

- use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate
- where appropriate, interpret simple expressions as functions with inputs and outputs
- work with coordinates in all four quadrants
- plot graphs of equations that correspond to straight-line graphs in the coordinate plane
- identify and interpret gradients and intercepts of linear functions graphically and algebraically
- Recognise, sketch and interpret graphs of linear functions
- plot and interpret graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration
- solve linear equations in one unknown algebraically; find approximate solutions using a graph
- change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts
- use compound units such as speed, unit pricing
- interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion
- solve geometrical problems on coordinate axes

- solve problems involving direct and inverse proportion, including graphical and algebraic representations
- compare lengths, areas and volumes using ratio notation; make links to similarity (including trigonometric ratios) and scale factors
- understand that X is inversely proportional to Y is equivalent to X is proportional to $\frac{1}{Y}$; interpret equations that describe direct and inverse proportion
- interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion

Right-angled triangles

- calculate with roots, and with integer indices
- round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures)
- simplify and manipulate algebraic expressions (including those involving surds) by: collecting like terms, multiplying a single term over a bracket
- understand and use standard mathematical formulae
- make links to similarity (including trigonometric ratios)
- apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras' Theorem and the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs
- know the formulae for: Pythagoras' Theorem $a^2 + b^2 = c^2$ and the trigonometric ratios, sine, cosine and tan; apply them to find angles and lengths in right-angled triangles in two dimensional figures

- calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions

Multiplicative reasoning

- interpret fractions and percentages as operators
- use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate
- understand and use standard mathematical formulae; rearrange formulae to change the subject
- change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts
- express one quantity as a percentage of another; solve problems involving percentage change, and original value problems including in financial mathematics
- solve problems involving direct and inverse proportion
- use compound units such as speed, rates of pay, unit pricing, density and pressure
- understand that X is inversely proportional to Y is equivalent to X is proportional to $\frac{1}{Y}$; interpret equations that describe direct and inverse proportion
- set up, solve and interpret the answers in growth and decay problems, including compound interest
- use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc)

Constructions, loci and bearings

- use scale factors, scale diagrams and maps
- use conventional terms and notation: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries;



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<ul style="list-style-type: none"> use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.) <p>Transformations</p> <ul style="list-style-type: none"> express a multiplicative relationship between two quantities as a ratio or a fraction make links to similarity and scale factors use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement describe translations as 2D vectors 	<ul style="list-style-type: none"> know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°; know the exact value of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60° 	<p>use the standard conventions for labelling and referring to the sides and angles of triangles; draw diagrams from written description</p> <ul style="list-style-type: none"> use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS) identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres construct and interpret plans and elevations of 3D shapes measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings
<p style="text-align: center;">KEY ASSESSMENTS</p> <p>HALF TERM 1 Unit assessment</p> <p>HALF TERM 2 End of Term 1 assessment</p>	<p style="text-align: center;">KEY ASSESSMENTS</p> <p>HALF TERM 3 Unit assessment</p> <p>HALF TERM 4 End of Term 2 assessment</p>	<p style="text-align: center;">KEY ASSESSMENTS</p> <p>HALF TERM 5 Unit assessment</p> <p>HALF TERM 6 End of Year assessments/PPEs</p>
<p>Students have access to Mathswatch revision resources and supporting video clips. https://vle.mathswatch.co.uk/vle/</p> <p>Edexcel Maths GCSE Foundation revision guides are available to support learning.</p> <p>Students can obtain further revision resources from www.mathsgenie.co.uk and www.corbettmaths.com</p>		