

KESTEVEN AND SLEAFORD HIGH SCHOOL

Mathematics Scheme of Learning

Year 10 – Term 1

(Sets 1 & 5 may deviate from termly timings but should continue to follow the route map. Set 1 should make explicit links between topics and generalise regularly. Set 5 should focus on key number and algebra skills spending longer where necessary to embed)

Intent – Rationale

“Maths is for everyone”. AQA GCSE Mathematics is designed to be diverse, engaging and essential to equip all students with the skills and knowledge to reach their future destination. Opportunities to make connections, generalise and apply are embedded where appropriate for each individual student. References to careers and future learning are shared with students. Term 1 aims to establish a secure understanding in algebraic manipulation. In recognising the large application of Ratio knowledge it is studied early to provide opportunity to revisit and apply frequently.

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
<ul style="list-style-type: none"> Year 9 Term 3 substitution and rearranging formulae Year 9 Term 1 factorising quadratics Year 9 Term 6 ratio (HSL) Year 9 Term 4 straight line graphs Year 9 Term 2 rounding and error intervals 	<ul style="list-style-type: none"> At GCSE application to area and perimeter problems, rearranging and substitution in to other key formulae such as Cosine rule, angles in a polygon, sketching graphs. A level Pure mathematics algebraic manipulation is essential for many topics including Calculus, exponentials and trigonometric identities.
What are the links with other subjects in the curriculum?	What are the links to SMSC, British Values and Careers?
<ul style="list-style-type: none"> Science: use of formulae including compound measures such as density, speed Technology: ratio to scale amounts in a recipe or of material/resources Geography: rounding and error intervals in Population statistics 	GB4 e)
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	What are the opportunities for developing mathematical skills?

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| <ul style="list-style-type: none"> Please fill this in with your own suggestions alternatively the LRC team will provide some suggested titles/links | <ul style="list-style-type: none"> Secure knowledge of algebraic manipulation and a focus on accurate use of language. Ratio is embedded in many AO2/3 questions linking to other topics including fractions/decimal/percentages and decision making. |
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Mathematics Scheme of Learning Year 10 – Term 1

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?

Know

The definition of identity, expression, equation and formula. Simplify and manipulate algebraic expressions including expanding and factorising linear and quadratic expressions. Substitute values in to formulae. Solve linear equations including with brackets, fractions and unknowns on both sides.

Change the subject of a formula with the variable appearing once and twice. Factorise quadratic equations with coefficients of x^2 . Solve quadratic equations by factorising. Know the quadratic formula and use so solve quadratic equations. Complete the square where $a \neq 1$, use to solve quadratic equations.

Simplify ratios in to form 1:n and simplest form, share quantities in a ratio and use a quantity to find another in a ratio. Express one quantity as a ratio of another. Solve combining ratio problems and changing ratio problems.

Use standard notation for labelling sides and angles. Know and give reason for finding missing angles in parallel lines and triangles. Measure and draw accurately 3 figure bearing angles. Apply angle properties to find missing angles.

Ensure confidence in working in all four quadrants. Identify parallel and perpendicular lines from their equation. Calculate the gradient and midpoint when two points are known on a line.

Rounding to an appropriate degree of accuracy and use to estimate calculations. State the error interval for a rounded value and use to find the upper and lower bound of calculations.

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Apply

Solve linear equations in context eg equivalent perimeters.

Use formulae required for other topics such as SUVAT equations, Cosine rule, quadratic formula.

Ratio problems in context.

Bearings in context eg boat/airplane travelling, scale diagrams

Interpret the intercepts and gradient in context.

Minimum and maximum calculations in context including area, compound measures and division problems.

Extend

Solve linear equations with simple algebraic fractions (linear only).

Solve quadratic equations and relate solutions to graphical representation.

Algebraic ratio problems.

Bearing problems where Pythagoras or trigonometry required. Angle of elevation or depression.

Solve geometrical graph problems using known coordinates and features of equation of a linear graph.

Minimum and maximum calculations with misleading wording

What subject specific language will be used and developed in this topic?	What opportunities are available for assessing the progress of students?
<ul style="list-style-type: none"> Formulae, formula, expressions, equations, identity, linear, quadratic, term, inverse, expanding, factorising, common factor, substitution, subject, simplify, simplify fully, equivalent, complete the square, coefficient, Ensure secure in exam command words, eg expanding is to remove from brackets, Ratio, variable, in terms of, proportion, parts, fraction, quantity, simplest form, Angle, \angleABC, scale, image, bearing, clockwise, anticlockwise, direction 	<p>AQA topic <u>open book</u> assessments (homework)</p> <p>Exam question practice in class – open book</p> <p>Mini quizzes including Kahoot</p> <p>Multiple choice to address misconceptions</p> <p>Recall starters:</p> <ul style="list-style-type: none"> • LLLWLTLY • Corbett 5 a day • Whiterose maths KS4 problem of the day • Mini quiz on Y9 Term 6 topics such as circle theorems and surds •

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<ul style="list-style-type: none"> • Gradient, intercept, roots, solution, axes, axis, coordinates, parallel, perpendicular, quadrant, midpoint, geometrical relationship • Rounding, truncate, significant figure, decimal place, error interval, minimum, maximum, greatest, least, upper bound, lower bound, degree of accuracy 	
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Basic Algebra & Linear Equations	R	A	G
Use basic algebra notation (3y,ab)			
Understand the concepts of expressions, equations, formulae, identities, inequalities, terms and factors			
Simplify and manipulate algebraic expressions by - collecting like terms, multiplying a term over a bracket, taking out common factors			
Substitute values into formulae			
Solve linear equations including those with unknown on both sides			

Rearranging & Quadratics	R	A	G
Change the subject of the formula with variable once			
Change the subject of the formula with variable twice			
Factorise quadratic expressions			
Solve quadratic equations by factorising			
Solve quadratic equations using the formula			
Complete the Square			
Solve quadratic equation by completing the square			

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Ratio	R	A	G
Work with fractions in ratio problems			
Express one quantity as a fraction of another			
Use ratio notation			
Divide a given quantity into two parts			
Combining ratios			
Changing ratios			

Scale diagrams & Bearings	R	A	G
Use the standard conventions for labelling and referring to the sides and angles of triangles			
Identify angles around a point, angles on a straight line, alternate angles, corresponding angles and supplementary angles			
Measure and draw accurately a 3 figure bearing			
Apply the properties of angles to bearings problems			
Apply scale factors to scale drawings including maps			

Coordinates and Linear Graphs	R	A	G
Work with co-ordinates in all four quadrants			
Use the form $y=mx+c$ to identify parallel and perpendicular lines			
Find the equation of the line through two given points or through one point with a gradient			
Calculate the midpoint of a straight line			

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Interpret the gradient and y intercept in a given context			
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Rounding	R	A	G
Round numbers to an appropriate degree of accuracy			
Estimate calculations using rounding to 1sf			
Use inequality notation to specify error intervals			
Apply limits of accuracy for upper and lower bounds			
Choose appropriate minimum or maximum calculation to solve problems			

Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
Expressions and Equations	Checking prior knowledge: Understand the concepts of expressions, equations, formulae, identities, inequalities, terms and factors. Use basic algebra notation (3y,ab).Simplify and manipulate algebraic expressions by - collecting like terms, multiplying a term over a bracket, taking out common factors		Use games to instil confidence with new class. Simplifying colouring
	Substitute values into formulae	Formulae with increased difficulty of using BIDMAS	Use formulae students are required to learn eg quadratic formula, volume formulae
	Solve linear equations including those with unknown on both sides	Following prior knowledge check focus on brackets and fractional equations	Progressive task – move to next ‘type’ as soon as ready. Medium or Challenge

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Rearranging and Quadratics	Change the subject of the formula with variable once	Eg use Cosine rule	Use recognisable formulae that students are required to learn for GCSE
	Change the subject of the formula with variable twice		
	Factorise quadratic expressions Difference of two squares (DOTS)	Recognise for $a = 1x$ and + integers	Begin with coefficient of x^2 to teach method . https://www.youtube.com/watch?v=v2sPNXdab10 Blue Oxford textbook has good practice
	Solve quadratic equations by factorising	Graphical representation of solutions	Blue Oxford textbook has good practice Mixed of quadratic and common factor (students find challenging to identify when to put in to two brackets)
	Solve quadratic equations using the formula		Pop goes the weasel song https://www.youtube.com/watch?v=2lbABbfU6Zc
	Complete the Square	Coefficient of x^2 , including -1 Turning points	Challenge worksheet Complete the square and sketch
	Solve quadratic equation by completing the square		Quadratic summary MAT
Ratio	Work with fractions in ratio problems. Express one quantity as a fraction of another		Equivalent fractions method (seen in yr9 T6 HSL)
	Use ratio notation. Divide a given quantity into two parts	Algebraic ratio problems	Card sort to check prior knowledge
	Combining ratios		Corbett maths booklet Don median Qs
	Changing ratios	Algebraic ratio problems	PP for algebraic and scaling methods Changing ratio worksheet
Scale diagrams & Bearings	Use the standard conventions for labelling and referring to the sides and angles of triangles.		Check prior knowledge: Angles in parallel lines colouring

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	Identify angles around a point, angles on a straight line, alternate angles, corresponding angles and supplementary angles		
	Measure and draw accurately a 3 figure bearing		DOT to DOT
	Apply the properties of angles to bearings problems	In context, boat/airplane problems	KDU worksheet
	Apply scale factors to scale drawings including maps	Pythagoras & Trig bearing problems. Angles of elevation and depression.	Using bearings – treasure hunt
Coordinates & Linear Graphs	Work with co-ordinates in all four quadrants. Use the form $y=mx+c$ to identify parallel and perpendicular lines		Check prior knowledge: Lower sets - battleships
	Find the equation of the line through two given points or through one point with a gradient		
	Calculate the midpoint of a straight line		The average.
	Interpret the gradient and y intercept in a given context		
Rounding	Round numbers to an appropriate degree of accuracy. Estimate calculations using rounding to 1sf		Mini whiteboards to check prior knowledge. Address misconceptions with calculations /0.14 rounding to 0.1 not 0
	Use inequality notation to specify error intervals		

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	Apply limits of accuracy for upper and lower bounds of calculations. Choose appropriate minimum or maximum calculation to solve problems	Problems with misleading wording “greatest number safely”	