Armfield Academy – Mathematics Department

Year 11 Curriculum Overview

Home Learning is completed using Century Maths. A Home Support guide can be found here.

Half Term 1		
Week	Curriculum Overview	HIGHER ONLY
1	**Data: Collecting, representing and interpreting data** • Find and interpret averages from a list • Find and interpret averages from a table • Problem solving questions with mean • Construct and interpret time series graphs • Construct and interpret stem-leaf diagrams • Construct and interpret two-way tables • Construct and interpret frequency tables and frequency polygons • Construct and interpret line and bar charts • Construct and interpret pie charts • Scatter graphs – Correlation/Lines of best fit • Criticise charts and graphs • Stratified sampling	**•Construct and interpret cumulative frequency diagrams** **•Use cumulative frequency diagrams to find measures** **• Construct and interpret Box plots** **•Construct and interpret histograms** **• Compare distrubutions** **•Linear interpolation grade 8/9 only**
2		
3	**Number 1 -Using number (Non calculator methods) (Indices and roots)** • Mental/written methods of integer/decimal addition and subtraction • Mental/written methods of integer/decimal multiplication and division • Four rules of fraction arithmetic • Rounding to decimal places and significant figures • Estimate answers to calculations • Bounds, focussing on error intervals (including truncating).	**Recurring decimals conversions** **Calculations with recurring decimals, non calc** **Understand and use surds** **Calculate with surds** **Upper and lower bounds/ bound calculations** **Understand and use fractional indices**
4	• Understand the difference between factors and multiples • Understand primes and express a number as a product of its prime factors • Find the HCF and LCM of a set of numbers • Square and cube numbers • Calculate higher powers and roots	
	• Powers of ten and standard form • Calculate with numbers in standard form • The addition and subtraction rules for indices • Work with powers of powers • Understand and use the power of zero and negative indices	

5	**Graphs** • Interpret real life graphs • Find the ccoordinates for the midpoiont of two cords • Equations of lines parallel to the axis • Plot straight line graphs • Interpret $y = mx + c$ • Find the equation of a straight line from a graph • Equation of a straight-line graph given one point and gradient • Equation of a straight-line graph given two points • Determine whether a point is on a line • Parallel lines (equal gradients)- Know how to give an equation that is parallel • Solve linear simultaneous equations graphically • Plot and read from quadratic graphs • Plot and read from Cubic and reciprocal graphs	• Recognise when straight lines are perpendicular • Find the equations of perpendicular lines
6		
Week	Curriculum Overview	
7	**Algebra 1** • Simplify algebraic expressions • Forming expressions and formula from words • Multiplying out brackets and simplifying • Substitution • Solving Equations • Forming Equations from words and diagrams • Linear Inequalities and number lines • Simple factorisation • Multiplying out two brackets • Factorising a quadratic • Difference of two squares • Solve Quadratic equations by factorising	• Factorise complex quadratic expressions • Solve complex quadratic expressions by factorisation • Complete the square • Solve quadratic equations using the quadratic formula • Add/subtract/multiply/divide Algebraic fractions • Solve equations with Algebraic fractions
8		
9		
10	**Probability** • Single event probability • Listing outcomes Frequency trees Complete and use Venn diagrams • Tree diagrams	•Capture – recapture Use the product rule for counting •Conditional probability, involving equations for grade 8/9
11	**Angles – Year 11 Mocks taking place** • Angles on straight line • Angles in Triangles and special triangles	**•Circle Theorems**
12		

	• Angle at a point add to 360 • Parallel lines / vertically opposite angles / Alternate /corresponding • Combination problems (Angle /Reason when tackling exam problems) • Know names / properties of basic shapes • Interior and exterior angles of polygon • Bearings	
13	**Mock review – Reteach week**	
	Half Term 3	
Week	Curriculum Overview	
14	**Algebra 2**	
15	• Recognise sequences of odd and even numbers, and other sequences including Fibonacci sequences • Write the term-to-term definition of a sequence in words • Find a specific term in the sequence using position-to-term or term-to-term rules • Generate arithmetic sequences of numbers, triangular numbers, square and cube integers and sequences derived from diagrams • Recognise such sequences from diagrams and draw the next term in a pattern sequence; • Find the next term in a sequence, including negative values; • Find the nth term- For a pattern sequence, Linear sequence • Use the nth term of an arithmetic sequence to - generate terms, decide if a given number is a term in the sequence, or find the first term over a certain number • Generate terms of a quadratic sequences • change the subject of a formula	• Find the nth term of quadratic sequence • Geometric sequences (not the nth term) • Complex changing the subject, including factorising • Proof
16	**Ratio and Proportion**	
17	• Write ratios in their simplest form • Write/interpret a ratio to describe a situation • Use Fractions in ratios • Share a quantity in a given ratio including three-part ratios • Solve a ratio problem in context • Compare ratios • Write ratios in form 1 : m or m : 1 • Solve proportion problems using the unitary method; • Direct Proportion • Inverse proportion (only simple ones, eg builders building a wall) • Work out which product offers best value and consider rates of pay	Direct/Inverse proportion • Constant of proportionality problems • Equations with proportion (constant of proportionality)
18	**Compound measures** • Speed, distance, time. (Focus on multi stage)	• Area under a curve

	• Pressure (focus on which 'area' to find) • Density (focus on mixtures) • Converting compound units eg k/h to m/s	• Calculating and interpreting Gradient of curves • Understand gradient of curve represents acceleration
19	- **Shape 2** - Identify and name common solids: cube, cuboid, cylinder, prism, pyramid, sphere and cone - Find the perimeter and area of rectangles and triangles; parallelograms and trapezia; compound shapes, - Sketch nets of cuboids and prisms - Recall and use the formula for the volume of a cuboid; - Find the surface area and volume of a prism, including a triangular prism, cube and cuboid; - Calculate volumes of right prisms and shapes made from cubes and cuboids; - Identify, name and draw parts of a circle including tangent, chord and segment; - Recall and use formulae for the circumference of a circle and the area enclosed by a circle; circumference of a circle = 2πr = πd, area of a circle = πr2; Use π ≈ 3.142 or use the π button on a calculator; - Find the radius or diameter, given the area or perimeter of a circle; - Calculate perimeters and areas of composite shapes made from circles and parts of circles; - Find the surface area and volume of a cylinder - Find the surface area and volume of spheres, pyramids, cones and composite solids. - Calculate arc lengths, angles and areas of sectors of circles; - Plans and elevations	• Area of a segment using Using A = 1/2 ab sin c (deliberately before trig) • Frustrums (if time, they have never appeared on new spec papers. Also not mentioned in Pearson spec. Link with similar cones.)
Half Term 4		
Week	Curriculum Overview	
20	- **Shape 2** Continued- see above	
21 22	**Pythagoras and Trigonometry** • Understand, recall and use Pythagoras' Theorem in 2D, including leaving answers in surd form; • Given 3 sides of a triangle, justify if it is right-angled or not; • Calculate the length of the hypotenuse in a right-angled triangle, including decimal lengths and a range of units; • Find the length of a shorter side in a right-angled triangle; • Apply Pythagoras' Theorem with a triangle drawn on a coordinate grid; • Calculate the length of a line segment AB given pairs of points; • Understand, use and recall the trigonometric ratios sine, cosine and tan, and apply them to find angles and lengths in general triangles in 2D figures; • Use the trigonometric ratios to solve 2D problems; • Find angles of elevation and depression;	- Use trigonometry and pythagoras in 3D - Sine and Cosine Rules (Include some bearings trig questions here if time for the most able)

	• Round answers to appropriate degree of accuracy, either to a given number of significant figures or decimal places, or make a sensible decision on rounding in context of question; • Know the exact values of sin ϑ and cos ϑ for ϑ = 0°, 30°, 45°, 60° and 90°; know the exact value of tan ϑ for ϑ = 0°, 30°, 45° and 60°.	
23	**Number 2 Fractions Percentages and Decimals** • FDP equivalence • Express a given number as a percentage of another number in more complex situations; • Calculate percentage profit or loss; • Make calculations involving repeated percentage change, not using the formula; • Find the original amount given the final amount after a percentage increase or decrease; • Use compound interest • Growth and decay	• Reverse compound interest - finding the power or the percentage
24	**Transformations** Perform reflections, rotations, translations and positive enlargements Fractional enlargements •Identify and desribe transformations •Combined transformations	• Negative enlargements • Understand and use trigonometrical graphs •Transform graphs (including trig) - Sketch and identify translations of the graph of a given function Sketch and identify reflections of the graph of a given function •Invariant points
25		
	Half Term 5	
Week	Curriculum Overview	

26	**Constructions (and functions)**
	• Understand congruence, as two shapes that are the same size and shape;
	• Visually identify shapes which are congruent;
	• Use straight edge and a pair of compasses to do standard constructions:
	  • understand, from the experience of constructing them, that triangles satisfying SSS, SAS, ASA and RHS are unique, but SSA triangles are not;
	  • construct the perpendicular bisector of a given line;
	  • construct the perpendicular from a point to a line;
	  • construct the bisector of a given angle;
	  • construct angles of 90°, 45°;
	• Draw and construct diagrams from given instructions, including the following:
	  • a region bounded by a circle and an intersecting line;
	  • a given distance from a point and a given distance from a line;
	  • equal distances from two points or two line segments;
	  • regions may be defined by 'nearer to' or 'greater than';
	Find and describe regions satisfying a combination of loci;
		•Functions, composite and inverse (Opportunity to revisit rearranging here)

27	**Algebra 3** - •Read solutions from graphs - •Algebraic simultaneous linear equations	- Solve simultaneous equations with one quadratic - Quadratic inequalities - Iteration

28		•Proof with vectors •Grade 8/9 - include co-linear
29	**Vectors** - Add and subtract vectors - Multiply vectors by scalars - Simple vector calculations (eg 2a+b). - Understand and use column notation in relation to vectors; - Be able to represent information graphically given column vectors; - Identify two column vectors which are parallel; - Calculate using column vectors, and represent graphically, the sum of two vectors, the difference of two vectors and a scalar multiple of a vector.	
30	**Similarity** - Identify similar shapes - Work out missing sides and angles in a pair given similar shapes (Use parallel line rules to work out missing angles) - Establish a pair of triangles are similar - Understand the difference between congruence and similarity - Understand and use conditions for congruent triangles	- Explore areas of similar shapes - Explore volumes of similar shapes - Solve mixed problems involving similar shapes - Prove a pair of triangles are congruent
31		