Hanley Castle High School curriculum outline for parents: **Maths**

		Autumn Term		Spring Term		Summer Term	
Year 9 Stage 9	**Topic** **Big question / Overview**	**Calculating fractions, decimals and percentages** *How does percentage change work?* Use multipliers for percentage increases and decreases; calculate simple and compound interest, compare quantities and work out percentage change. **Algebraic proficiency: tinkering** *How do we manipulate quadratic expressions?* Expand pairs of brackets, factorise quadratic expressions, recognise identities and show why equivalent expressions represent the same value. **Understanding risk** *How can we predict combined outcomes?* List outcomes in possibility spaces, use sets and Venn diagrams, and calculate expected results from theoretical and experimental probability.	**Understanding risk** *What happens when events are combined?* Use probability tree diagrams and addition or multiplication rules to calculate probabilities of combined events, including independent and dependent events. **Algebraic proficiency: visualising** *What do straight-line graphs tell us?* Plot and interpret linear graphs; calculate gradients and intercepts, recognise parallel lines, and interpret piecewise and distance-time graphs in context. **Calculating** *How precise is a calculated value?* Calculate using standard form; round and truncate values; identify upper and lower bounds and use error intervals to describe possible values.	**Visualising and constructing** *How can we construct accurate diagrams?* Use a ruler and compasses to construct bisectors and loci; work with scale drawings, bearings, plans and elevations to solve geometrical problems. **Proportional reasoning** *How are quantities linked?* Distinguish direct from inverse proportion; interpret their graphs and formulae, and solve problems involving ratios, exchange rates and similar shapes.	**Solving equations and inequalities** *How do we describe a range of solutions?* Solve linear inequalities, including brackets and unknowns on both sides; show solution sets on number lines and model practical constraints. **Calculating space** *How can we solve problems with circles and triangles?* Find arc lengths, sector areas and cylinder surface areas; apply Pythagoras' theorem to missing lengths and distances in two dimensions.	**Solving equations and inequalities** *How can two equations be solved together?* Find graphical solutions and solve pairs of linear simultaneous equations by elimination; form equations from problems and interpret their solutions. **Investigating properties of shapes** *How can trigonometry find missing lengths?* Use similarity and sine, cosine and tangent to calculate sides and angles of right-angled triangles, including bearings and elevation problems. **Algebraic proficiency: visualising 2** *How do different graphs behave?* Interpret gradients and rates of change; draw quadratic, cubic and reciprocal graphs, estimate roots and interpret turning points and motion graphs.	**Conjecturing** *How can we prove a geometrical result?* Explain angle facts, use triangle congruence conditions and apply congruence and similarity to construct clear geometrical proofs. **Mathematical movement** *How do transformations change a shape?* Combine reflections, rotations, translations and enlargements; use fractional or negative scale factors and describe what changes and what stays the same.
	Disciplinary knowledge/skills	Calculate and compare percentage changes, and justify algebraic equivalence and probability predictions.	Analyse combined events, represent relationships graphically and check the accuracy of numerical answers.	Construct accurate geometrical diagrams and model direct or inverse relationships.	Justify inequality solutions and apply geometrical formulae and Pythagoras' theorem.	Solve simultaneous equations, interpret trigonometric ratios and analyse non-linear graphs.	Build mathematical proofs and describe the effect of combined transformations.
	New vocabulary	Percentage Multiplier Increase Decrease Simple interest Compound interest Percentage change Identity Expand Quadratic Factorise Binomial Equivalent Expression Possibility space Set Venn diagram Union Intersection Theoretical Experimental Expected outcome	Tree diagram Combined event Independent Dependent Probability Addition rule Multiplication rule Gradient Intercept Linear Parallel Equation Coordinate Distance-time graph Standard form Significant figure Truncate Round Upper bound Lower bound Error interval	Bisector Perpendicular Locus Scale Bearing Plan Elevation Compass Direct proportion Inverse proportion Ratio Similarity Scale factor Exchange rate Unit price	Inequality Solution set Integer Number line Variable Bound Bracket Arc Sector Tangent Surface area Cylinder Pythagoras Hypotenuse Pi	Simultaneous equations Elimination Intersection Solution Variable Graph Similarity Sine Cosine Tangent Hypotenuse Opposite Adjacent Elevation Gradient Rate of change Quadratic Cubic Reciprocal Root Turning point	Conjecture Proof Congruence Similarity SSS SAS ASA RHS Reflection Rotation Translation Enlargement Fractional scale factor Negative scale factor Invariant