Ursuline Academy Ilford

Maths (Year 8)

	Initial – *a student who is still initial will be able to meet some of the following with support:*	**Emerging** – *a student whose understanding is still emerging will be able to:*	**Developing** – *a student whose understanding is developing will also be able to:*	**Secure** – a *student whose understanding is secure will also be able to:*	**Advanced** – *a student whose understanding is advanced will be able to do some of the following:*	**Mastered** – *a student who has mastered their understanding will be able to do all of the following consistently:*
Proportional reasoning	• Understand the meaning and representation of ratio. • Understand and use ratio notation. • Express ratios in their simplest integer form. • Represent multiplication of fractions. • Multiply a fraction by an integer. • Divide an integer by a fraction.		• Express ratios in the form 1 : n. • Solve problems involving ratios of the form 1 : n or (n : 1). • Divide a value into a given ratio. • Compare ratios and related fractions. • Solve problems involving direct proportion. • Understand scale factors as multiplicative representations. • Find the product of a pair of unit fractions. • Divide a fraction by a unit fraction. • Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction.	• Solve proportional problems involving the ratio m : n. • Understand n as the ratio between diameter and circumference. • Understand gradient of a line as a ratio. • Explore conversion graphs. • Convert between currencies. • Explore relationships between similar shapes. • Draw and interpret scale diagrams. • Find the product of a pair of any fractions. • Understand and use the reciprocal to divide any pair of fractions. • Multiply and divide improper and mixed fractions. • Use scale factors, scale diagrams and maps. • Divide a given quantity into two parts in a given part and express the division of a quantity into two parts as a ratio.	• Explore direct proportion graphs. • Interpret maps using scale factors and ratios. • Multiply and divide algebraic fractions. • Make connections between number relationships, and their algebraic and graphical representations. • Extend and formalise their knowledge of ratio and proportion in working with measures and in formulating proportional relations algebraically. • Interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning. • Solve problems involving direct and inverse proportion, including graphical and algebraic representations. • Move freely between different

			• Solve problems involving direct and inverse proportion. • Consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals and fractions. • Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.	numerical, algebraic, graphical and diagrammatic representations. • Select and use appropriate calculation strategies to solve increasingly complex problems.
Representations & algebraic techniques	• Work with coordinates in all four quadrants. • Identify different types of data. • Read and interpret ungrouped frequency tables . • Draw and interpret scatter graphs. • Understand and describe linear correlation.	• Identify and draw lines that are parallel to the axes. • Recognise and use the line y = x. • Draw and use line of best fit (1) & (2). • Read and interpret grouped frequency tables. • Represent data in two-way tables. • Construct sample spaces for 1 or more events. • Find probabilities from a sample space. • Use directed number with algebra. • Multiply out a single bracket. • Generate sequences given a rule in words. • Adding and subtracting expressions with indices. • Describe simple mathematical relationships between two	• Recognise and use lines of the form y = kx Link y = kx to direct proportion problems. • Explore the gradient of the line y = kx. • Recognise and use lines of the form y = x+a. • Link graphs to linear sequences. • Plot graphs of the form y = mx + c. • Find the midpoint of a line segment. • Identify non-linear relationships. • Represent grouped discrete data. • Represent continuous data grouped into equal classes. • Find probabilities from two-way tables. • Find probabilities from Venn diagrams. • Form algebraic expressions. • Factorise into a single bracket. • Expand multiple single brackets and simplify.	• Explore graphs with negative gradient (y = -kx, y = a - x,x + y = a). • Explore non-linear graphs. • Use the product rule for finding the total number of possible outcomes. • Expand a pair of binomials. • Solve equations, including with brackets. • Form and solve equations with brackets. • Generate sequences given a complex algebraic rule. • Using the addition and subtraction laws for indices. • Move freely between different numerical, algebraic, graphical and diagrammatic representations. • Make connections between number relationships, and their algebraic and graphical representations substitute numerical values into formulae and expressions recognise, sketch and

		variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs	• Understand and solve simple inequalities. • Generate sequences given a simple algebraic rule. • Find the rule for the nth term of a linear sequence. • Simplifying algebraic expressions by multiplying and dividing indices. • Develop algebraic and graphical fluency, including understanding linear (and simple quadratic) functions. • Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data.	produce graphs of linear functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane. • Use language and properties precisely to analyse probability and statistics. • Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale. • Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.
Number	• Calculate using the order of operations • Calculate with money • use standard units of mass, length, time, money and other measures, including with decimal quantities	• Calculate fractions, decimals and percentages of an amount using calculator methods • Express one number as a fraction or a percentage of another without a calculator • Express one number as a fraction or a percentage of another using calculator methods • Investigate positive powers of 10 • Round numbers to powers of 10, and 1 significant figure • Round numbers to a given number of decimal places • Solve problems involving time and the calendar • Round numbers and measures to	• Convert fluently between key fractions, decimals and percentages • Calculate key fractions, decimals and percentages of an amount without a calculator • Convert between decimals and percentages greater than 100% Percentage decrease with a multiplier • Calculate percentage increase and decrease using a multiplier • Work with numbers greater than 1 in standard form • Compare and order numbers in standard form • Mentally calculate with numbers in standard form	• Investigate negative powers of 10 • Work with numbers between 0 and 1 in standard form • Work interchangeably with terminating decimals and their corresponding fractions • Interpret fractions and percentages as operators • Multiply and divide numbers in standard form • Understand and use negative indices • Understand and use fractional indices • Convert metric units of area • Convert metric units of volume • Use approximation through rounding to estimate answers and calculate

		an appropriate degree of accuracy (for example, to a number of decimal places or significant figures)	• Add and subtract numbers in standard form • Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics • Define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100% • Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations • Interpret and compare numbers in standard form $A \times 10n$, $1 \leq A < 10$, where n is a positive or negative integer or zero • Use a calculator to work with numbers in standard form • Estimate the answer to a calculation Understand and use error interval notation • Covert metric measures of length • Convert metric units of weight and capacity • Use a calculator and other technologies to calculate results	possible resulting errors expressed using inequality notation $a < x \leq b$

			accurately and then interpret them appropriately.	
Geometry	• Investigate the properties of special quadrilaterals • Use the standard conventions for labelling the sides and angles of triangle ABC • Derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies	• Understand and use basic angles rules and notation • Investigate angles between parallel lines and the transversal • Identify and calculate with alternate and corresponding angles • Constructions triangles and special quadrilaterals • Identify and calculate with sides and angles in special quadrilaterals • Understand and use the properties of diagonals of quadrilaterals • Understand and use the sum of exterior angles of any polygon • Prove simple geometric facts • Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles • Understand and use the relationship between parallel lines and alternate and corresponding angles • Derive and use the standard ruler and compass constructions (H only) • Describe, sketch and draw using conventional terms and notations: points, lines, parallel lines,	• Identify and calculate with co-interior, alternate and corresponding angles Solve complex problems with parallel line angles • Calculate and use the sum of the interior angles in any polygon • Calculate missing interior angles in regular polygons • Construct an angle bisector • Construct a perpendicular bisector of a line segment. • Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons • Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia • Calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes	

		perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric • Identify properties of, and describe the results of reflections applied to given figures		
Reasoning with data	• Set up a statistical enquiry • Design and criticise questionnaires • Draw and interpret pictograms, bar charts and vertical line charts • Draw and interpret line graphs	• Draw and interpret multiple bar charts • Choose the most appropriate diagram for given set of data • Find and interpret the range	• Draw and interpret pie charts • Represent and interpret grouped quantitative data • Compare distributions using charts Identify misleading graphs • Understand and use the mean, median and mode • Find the mean from an ungrouped frequency table • Find the mean from an grouped frequency table Identify outliers	• Choose the most appropriate average • Compare distributions using averages and the range • Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) • Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data • Describe, interpret and compare observed distributions of a single variable through appropriate measures of central tendency and spread