2.1 Foundation tier

Foundation tier – Number
Understanding number and place value
Reading and writing whole numbers of any magnitude expressed in figures or words. Rounding whole numbers to the nearest 10, 100, 1000, etc. Understanding place value and decimal places. Rounding decimals to the nearest whole number or a given number of decimal places.
Using the equivalences between decimals, fractions, ratios and percentages. Converting numbers from one form into another. Ordering and comparing whole numbers, decimals, fractions and percentages. Understanding and using directed numbers, including ordering directed numbers.
Understanding number relationships and methods of calculation
Using the common properties of numbers, including odd, even, multiples, factors, primes. Expressing numbers as the product of their prime factors. Using the terms square, square root and cube. The use of index notation for positive integral indices. Interpreting numbers written in standard form in the context of a calculator display. Using the facilities of a calculator to plan a calculation and evaluate expressions. Using addition, subtraction, multiplication, division, square and square root. Knowing how a calculator orders its operations. (Candidates will not be expected to list the key depressions that they have made.) Using calculators effectively and efficiently. Reading a calculator display correct to a specified number of decimal places.

Foundation tier – Number
Understanding and using number operations and the relationships between them, including inverse operations and the hierarchy of operations. Addition, subtraction, multiplication and division of whole numbers, decimals, fractions and negative numbers. Finding a fraction or percentage of a quantity. Expressing one number as a fraction or percentage of another. Calculating fractional and percentage changes (increase and decrease). Calculating using ratios in a variety of situations; proportional division. The use of a non-calculator method to multiply and divide whole numbers up to and including the case of multiplication and division of a three-digit number by a two-digit number.
Recognising that recurring decimals are exact fractions, and that some exact fractions are recurring decimals.
Estimating and approximating solutions to numerical calculations. Using estimation in multiplication and division problems with whole numbers to obtain approximate answers, e.g. by first rounding the numbers involved to 1 significant figure. Candidates must show sufficient working in order to demonstrate how they have obtained their estimate.
Solving numerical problems
Interpretation and use of mathematical information presented in written or visual form when solving problems, e.g. TV programme schedules, bus/rail timetables, distance charts, holiday booking information. Money: The basic principles of personal and household finance, including fuel and other bills, hire purchase, discount, VAT, taxation, best buys, wages and salaries, loan repayments, mortgages, budgeting, exchange rates and commissions. Simple interest. Profit and loss. Foreign currencies and exchange rates. Carrying out calculations relating to enterprise, saving and borrowing, investing, appreciation and depreciation.
Giving solutions in the context of a problem, interpreting the display on a calculator. Interpreting the display on a calculator. Knowing whether to round up or down as appropriate.
Understanding and using Venn diagrams to solve problems.

Foundation tier – Algebra
Understanding and using functional relationships
Recognition, description and continuation of patterns in number. Description, in words, of the rule for the next term of a sequence.
Construction and interpretation of conversion graphs. Construction and interpretation of travel graphs. Construction and interpretation of graphs that describe real-life situations. Interpretation of graphical representation used in the media, recognising that some graphs may be misleading.
Using coordinates in 4 quadrants. Drawing and interpreting the graphs of $x = a, y = b, y = ax + b.$
Understanding and using equations and formulae
Substitution of positive and negative whole numbers, fractions and decimals into simple formulae expressed in words or in symbols. Understanding the basic conventions of algebra. Formation and simplification of expressions involving sums, differences and products. Collection of like terms. Expansion of $a(bx + c)$, where a, b and c are integers. Formation, manipulation and solution of linear equations.

Foundation tier – Geometry and Measure
Understanding and using properties of shape

The geometrical terms: point, line, plane, parallel, right angle, clockwise and anticlockwise turns, perpendicular, horizontal, vertical, acute, obtuse and reflex angles, face, edge and vertex.

Vocabulary of triangles, quadrilaterals and circles: isosceles, equilateral, scalene, exterior/interior angle, diagonal, square, rectangle, parallelogram, rhombus, kite, trapezium, polygon, pentagon, hexagon, radius, diameter, tangent, circumference, chord, arc, sector, segment.

Simple solid figures: cube, cuboid, cylinder, cone and sphere.

Interpretation and drawing of nets.
Using and drawing 2-D representations of 3-D shapes, including the use of isometric paper.

Accurate use of ruler, pair of compasses and protractor. (Lengths accurate to 2mm and angles accurate to $2°$.)

Bisecting a given line, bisecting a given angle.

Constructing 2-D shapes from given information.

Angles at a point. Angles at a point on a straight line.
Opposite angles at a vertex.

Parallel lines.
Corresponding, alternate and interior angles.

Angle properties of triangles.
Using the fact that the angle sum of a triangle is $180°$.

Understanding and using properties of position, movement and transformation

Solving problems in the context of tiling patterns and tessellation.

Using and interpreting maps.
Interpretation and construction of scale drawings.
Scales may be written in the form 1 cm represents 5 m, or 1:500.

Use of bearings. (Three figure bearings will be used e.g. $065°$, $237°$.)

Foundation tier – Geometry and Measure
Understanding and using measures
Standard metric units of length, mass and capacity. The standard units of time; the 12- and 24- hour clock. (The notation for the 12- and 24- hour clock will be 1:30 p.m. and 13:30.) Knowledge and use of the relationship between metric units of length, mass, capacity, area and volume. Making sensible estimates of measurements in everyday situations, recognising the appropriateness of units in different contexts. Conversion between the following metric and Imperial units: km - miles; cm, m - inches, feet; kg - lb; litres - pints, gallons. Candidates will be expected to know the following approximate equivalences: 8km $\approx$ 5 miles, 1kg $\approx$ 2·2 lb, 1 litre $\approx$ 1·75 pints
Reading and interpreting scales, including decimal scales.
Using compound measures including speed. Using compound measures such as m/s, km/h, mph and mpg.
Estimating the area of an irregular shape drawn on a square grid. Calculating: - perimeter and area of a square, rectangle, triangle, parallelogram, trapezium, circle, semicircle and composite shapes. - surface area, cross-sectional area and volume of cubes and cuboids.

Foundation tier – Statistics
Understanding and using the statistical problem solving process: specifying the problem/planning; collecting, processing and representing data; interpreting and discussing results.
Specifying the problem and planning
Specifying and testing hypotheses, taking account of the limitations of the data available. Designing and criticising questions for a questionnaire, including notions of fairness and bias.
Processing, representing and interpreting data
Sorting, classification and tabulation of qualitative (categorical) data, discrete or continuous quantitative data. Grouping of discrete or continuous data into class intervals of equal widths. Understanding and using tallying methods.
Constructing and interpreting pictograms, bar charts and pie charts for qualitative data. Constructing and interpreting vertical line diagrams for discrete data. Constructing line graphs for the values of a variable at different points in time; understanding that intermediate values in a line graph may or may not have meaning. Simple cases of constructing and interpreting grouped frequency diagrams. Temperature charts. Constructing and interpreting scatter diagrams for data on paired variables. Mean, median and mode for a discrete (ungrouped) frequency distribution. Comparison of two distributions using one measure of central tendency (i.e. the mean or the median). Modal category for qualitative data. Modal class for grouped data. Calculating or estimating the range applied to discrete data. Drawing 'by eye' a line of 'best fit' on a scatter diagram, understanding and interpreting what this represents.

Foundation tier – Statistics
Discussing results
Recognising that graphs may be misleading. Looking at data to find patterns and exceptions. Drawing inferences and conclusions from summary measures and data representations, relating results back to the original problem. Drawing of conclusions from scatter diagrams; using terms such as positive correlation, negative correlation, little or no correlation. Appreciating that correlation does not imply causality.
Estimating and calculating the probabilities of events
Understanding and using the vocabulary of probability, including notions of uncertainty and risk. The terms 'fair', 'evens', 'certain', 'likely', 'unlikely ' and 'impossible'.