Methods 2 – Higher Specification

Note: Bold is Higher Only and *Italic not assessed in other units at all*

M2.N Number

1 Understand and use number operations and the relationships between them, including inverse operations and hierarchy of operations.

2 Arithmetic of real numbers. **Including exact calculation with surds and π Answers may be required in these forms.**

3 Numbers and their representations including powers, roots, indices (integers). Specifically tested in M1 and A1.(This might mean not tested here?)

4 Approximate to specified degrees of accuracy including a given power of ten, number of decimal places and significant figures.

5 Use the concepts and vocabulary of factor (divisor), multiple, common factor, common multiple, highest common factor, least common multiple, prime number and prime factor decomposition.

6 Understand that factors of a number can be derived from its prime factorisation.

7 Understand that 'percentage' means 'number of parts per 100' and use this to compare proportions.

8 Understand and use the relationship between ratio and fractions.

9 Find proportional change, using fractions, decimals and percentages. **Including repeated proportional change.**

10 Use calculators effectively and efficiently. **Including trigonometric functions.** Candidates should know not to round off values during the intermediate steps of a calculation.

11 Understand and use Venn diagrams to solve problems. Simple numerical problems where the use of a Venn diagram aids the solution. Set notation will not be assessed in this unit

M2.A Algebra

1 Distinguish the different roles played by letter symbols in algebra, using the correct notation.

2 Manipulate algebraic expressions by collecting like terms, by multiplying a single term over a bracket, taking out common factors. **Multiplying two linear expressions, factorising quadratic expressions including the difference of two squares, and simplifying rational expressions.**

3 Set up, and solve simple equations.

4 Solve quadratic equations exactly by factorising, completing the square and using the formula.

5 Generate terms of a sequence using term-to-term and position-to-term definitions.

6 Form linear expressions to describe the nth term of a sequence **Form quadratic expressions to describe the nth term of a sequence.**

7 Use the conventions for coordinates in the plane and plot points in all four quadrants.

8 Use geometric information to complete diagrams on a coordinate grid.

9 Recognise and use equivalence in numerical, algebraic and graphical representations. Candidates should be able to move from one form of representation to another to get different perspectives on the problem.

M2.G Geometry

1 Recall and use properties of angles at a point, angles at a point on a straight line (including right angles), perpendicular lines, and vertically opposite angles.

2 Understand and use the angle properties of parallel and intersecting lines, triangles and quadrilaterals. Candidates should know the meaning and properties of 'alternate', 'corresponding', 'interior' and 'vertically opposite' angles. Colloquial terms such as 'Z angles' should not be used. Candidates should know the names and properties of isosceles, equilateral, right-angled and scalene triangles.

3 Recall the properties and definitions of special types of quadrilateral, including square, rectangle, parallelogram, trapezium, kite and rhombus.

4 Recognise reflection and rotation symmetry of 2D shapes.

5 Calculate and use the sums of the interior and exterior angles

of polygons. Candidates should be able to calculate the values of the interior angle, exterior angle and angle at the centre of regular polygons. At Foundation tier these will be restricted to triangle, square, pentagon, hexagon, octagon, nonagon and decagon.

6 Solve problems in the context of tiling patterns and tessellation. Candidates will be required to know that the sum of the angles at a point is 360º.

7 Understand, prove and use circle theorems and the intersecting chords theorem Includes cyclic quadrilaterals; angle at centre is twice angle at circumference; angle in a semicircle is 90º; angles in the same segment are equal; opposite angles in cyclic quadrilateral sum to 180º; alternate segment theorem.

8 Understand and use the midpoint and the intercept theorems. The two forms of the midpoint theorem should be known.

9 Understand and construct geometrical proofs using formal arguments, including proving the congruence, or non congruence of two triangles in all possible cases.

10 Describe and transform 2D shapes using single or combined rotations, reflections, translations, or enlargements by a positive scale factor and distinguish properties that are preserved under particular transformations. **Enlargements by positive fractional and negative scale factors.**

11 Use 2D vectors to describe translations.

12 Use vectors to solve simple geometric problems and construct geometric arguments. Understand and use vector notation; calculate and represent graphically the sum of two vectors; the difference of two vectors and a scalar multiple of a vector; calculate the resultant of two vectors; understand and use the commutative and associative properties of vector addition.

13 Understand congruence and similarity, including the relationship between lengths, in similar figures. **Including the relationship between areas and volumes of similar shapes.**

14 Use Pythagoras' theorem in 2D. **Extend to 3D**.

15 Use the trigonometric ratios to solve 2D and 3D problems. Use the sine and cosine rules to solve problems in 2D and 3D.

16 Distinguish between centre, radius, chord, diameter, circumference, tangent, arc, sector and segment.

17 Find circumferences of circles and areas enclosed by circles.

18 Calculate perimeters and areas of shapes made from triangles and rectangles **Extend to other compound shapes. eg, shapes made from circles or part circles with other known shapes.**

19 Calculate the area of a triangle using 1/2ab sin C.

20 Calculate volumes of right prisms and of shapes made from cubes and cuboids. Including cylinders.

21 Solve mensuration problems involving more complex shapes and solids. Including cones and spheres. Including compound shapes and frustums.