Unit 1 – Number 1

Indices, Powers and Roots

- use index notation and index laws for zero, positive and negative powers **(M7)**
- **(M7)**
- use index notation and index laws for integer, fractional and negative powers **(M8)**

Number Systems

- understand the principles of number systems **(M6)**
- convert numbers from decimal to binary (base 2) and vice versa **(M6)**

Unit 2 – Algebra 1

Equations

- use systematic trial and improvement to find approximate solutions of equations where there is no simple analytic method for solving them **(M6)**
- set up and solve two linear simultaneous equations algebraically **(M7)**
- set up equations and solve problems involving direct proportion, including graphical and algebraic representations **(M7)**
- set up equations and solve problems involving indirect proportion, including graphical and algebraic representations **(M8)**
- set up and solve two simultaneous equations, one linear and one non linear **(M8)**

Expressions and Formulae

- change the subject of a simple formula **(M6)**
- change the subject of a formula, including cases where a power or root of the subject appears and including cases where the subject appears in more than one term **(M7)**

Inequalities

- solve linear inequalities in one variable, and represent the solution set on a number line **(M6)**
- solve linear inequalities in two variables, representing the solution set on a graph **(M7)**

Indices

- use index laws in algebra for positive powers **(M6)**
- use index laws in algebra for integer powers **(M7)**
- use index laws in algebra for integer, fractional and negative powers **(M8)**

Sequences

- find the nth term of a sequence where the rule is linear **(M6)**
- find the nth term of non-linear sequences **(M7)**

Unit 3 – Geometry and Measures 1

Enlargements

- describe and transform 2D shapes using enlargements by a fractional scale factor **(M7)**
- enlarge 2D shapes using negative scale factors **(M8)**

Reflections

- describe and transform 2D shapes using reflections in lines parallel to the x or y axes **(M6)**
- describe and transform 2D shapes using reflections in the line y = +/-x **(M7)**

Rotations

- describe and transform 2D shapes using rotations about any point **(M6)**

Translations

- describe and transform 2D shapes using translations, to include using vector notation **(M6)**

Transformations

- distinguish properties that are preserved under particular transformations **(M6)**
- describe and transform 2D shapes using combined transformations **(M7)**

Similarity

- understand the effect of enlargement on perimeter and area of shapes **(M6)**
- understand and use the effect of enlargement on the volume of solids **(M7)**
- use the relationship between the ratios of lengths and areas of similar 2D shapes **(M7)**
- use the relationship between the ratios of lengths, areas and volumes of similar 3D shapes **(M8)**

Congruence

- understand the term congruent **(M6)**

Unit 4 - Number 2

Accuracy and Bounds

- use surds and pi in exact calculations **(M7)**
- interpret, order and calculate with numbers written in standard index form **(M7)**
- simplify numerical expressions involving surds, including the rationalisation of the denominator of a fraction such as $5/3\sqrt{2}$ **(M8)**

Fractions and Decimals

- distinguish between rational and irrational numbers **(M8)**
- change a recurring decimal to a fraction **(M8)**

Growth and Decay

- set up, solve and interpret the answers in growth and decay problems, for example use the formula for compound interest **(M8)**

Unit 5 – Algebra 2

Co-ordinate Geometry

- recognise and use the equation of a circle, centre the origin and radius r **(M8)**
- find the equation of a tangent to a circle at a given point on the circle **(M8)**

Graphs and Gradients

- interpret the gradient at a point on a curve as the instantaneous rate of change **(M8)**

Using Graphs

- solve two linear simultaneous equations graphically **(M6)**
- generate points and plot graphs of simple quadratic functions and use these to find approximate solutions for points of intersection with lines of the form y = +/- a only **(M6)**
- recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions and the reciprocal function $y=a/x$ with $x \neq 0$ **(M7)**
- generate points and plot graphs of simple quadratic functions and use these to find approximate solutions for points of intersection with lines of the form y = mx + c **(M7)**
- recognise, sketch and interpret graphs of exponential functions y = kx for positive values of k, for example growth and decay rates **(M8)**
- find the intersection points of the graphs of a linear and quadratic function, knowing that these are the approximate solutions of the corresponding simultaneous equations representing the linear and quadratic functions, which may require algebraic manipu **(M8)**

Unit 6 – Geometry and Measures 2

Angle Properties

- calculate and use the sums of interior and exterior angles of polygons **(M6)**

Trigonometry

- understand and use the sine and cosine rules **(M8)**
- calculate the area of a triangle using A=1/2.absinC **(M8)**
- use Pythagoras' theorem and trigonometry to solve 2D and 3D problems **(M8)**

Working with Scale Drawings

- use and understand bearings **(M6)**

Constructions

- use the standard ruler and compass constructions **(M6)**
- identify the loci of points, including real life problems **(M6)**

Unit 7 – Handling Data 1

Counting and Listing Outcomes

- systematically list all outcomes for single events and for two successive events **(M6)**
- use the product rule for counting: if there are m ways of doing one task and for each of these there are n ways of doing another task, then the total number of ways the two tasks can be done is m x n **(M7)**

Experimental Probability

- understand and use estimates or measures of probability from theoretical models (including equally likely outcomes) or from relative frequency **(M6)**
- compare experimental data and theoretical probabilities **(M6)**
- understand that increasing sample size generally leads to better estimates of probability **(M6)**

Probability Rules

- know when to add or multiply two probabilities : if A and B are mutually exclusive, then the probability of A or B occurring is P(A) + P(B), whereas if A and B are independent events, the probability of A and B occurring is P(A) x P(B) **(M7)**

Probability Problems

- use the most appropriate method when solving complex probability problems **(M8)**

Probability Tree Diagrams

- use tree diagrams to represent successive events which are independent **(M7)**
- use tree diagrams to represent successive events that are not independent **(M8)**