## Year 10 Edexcel Foundation Maths Course Outline

| Students have 8 lessons per fortnight <br> Homework is set 4 times a fortnight mainly from student practice book to be found on Firefly |  |  |  |
| :---: | :---: | :---: | :---: |
|  | Topic and approximate duration | Key Learning Areas | Homework Options <br> Students will be guided by the class teacher as to which level to complete (according to target level) |
|  | Perimeter area and volume 1 <br> Graphs | Students should be able to: Find the perimeter and area of rectangles and triangles; calculate the area of parallelograms; estimate lengths; calculate a missing length given the area; solve worded area and perimeter questions; calculate the area and perimeter of trapezia; convert between area measures; find the height of a trapezium given its length; calculate the perimeter and area of compound shapes made from triangles and rectangles; calculate areas in hectares and convert between hectares and m 2 ; problem solving compound area problems; calculate the surface area of a prism; calculate the surface are of a cuboid; calculate the surface are of a prism; calculate the volume of a cuboid; calculate the volume of a prism; solve problems involving surface area and volume; convert between measures of volume. <br> Students should be able to: Co-ordinates in four quadrants; find the midpoint of a line segment; recognise, name and plot horizontal and vertical graphs; recognise, name and plot the graphs of $\mathrm{y}=$ $x$ and $y=-x$; draw graphs to represent relationships; substitute positives and negatives into expressions; plot a straight line graph from a table of values; understand terms parallel, gradient, intercept; find the gradient of a line (one across...); identify and interpret the gradient from an equation; understand that parallel lines have the same gradient; calculate the gradient given 2 points; match equations of lines which are parallel; understand what $m$ and $c$ represent in $y=m x+$ c ; sketch graphs given the values of m and c ; draw and interpret graphs from real data; comparing graphs using mathematical arguments; substitute into speed formula; use, draw and interpret distance time graphs to solve problems; interpret rate of change from distance time graphs; find the midpoint and gradient from a line segment recap; understand when predictions are reliable; Interpolation and extrapolation. | Practice book chapter 8 <br> - Areas <br> - Volumes <br> - Surface areas <br> - Exam questions (assessed) <br> Practice book chapter 9 <br> - Midpoint <br> - $Y=m x+c$ <br> - Gradient <br> - Draw and interpret distance time graphs <br> - Exam questions (assessed) |
|  | Nature of Landmark Assessment | A 35 minute tests at the end of each topic will be averaged to give a grade for the half term. |  |


|  | $\begin{array}{l}\text { Topic and } \\ \text { approximate } \\ \text { duration }\end{array}$ |  | Key Learning Areas | $\begin{array}{c}\text { Homework Options } \\ \text { Students will be guided by the } \\ \text { class teacher as to which level } \\ \text { to complete (according to }\end{array}$ |
| :--- | :--- | :--- | :--- | :--- |
| target level) |  |  |  |  |$]$


|  | Topic and approximate duration | Key Learning Areas | Homework Options <br> Students will be guided by the class teacher as to which level to complete (according to target level) |
| :---: | :---: | :---: | :---: |
|  | Multiplicative reasoning <br> Midyear Test | Students should be able to: Calculating simple percentages; write one value as a fraction and percentage of another; calculate percentage profit or loss; express a given number as a percentage of another number in more complex situations; increase or decrease an amount by a given percentage; reverse percentages; percentage multipliers; find an amount after repeated percentage changes; calculate compound interest; solve growth and decay problems; solve problems involving Density, Mass and Volume; solve problems involving pressure, force and area; problem solving questions on compound measures; calculate average speed, distance and time; use formulae to calculate speed and acceleration; relate formula of acceleration to the gradient of a velocity time graph; conversion Graphs; write a ratio as a unit ratio; solve problems involving direction proportion; solve problems involving inverse proportion; proportion problems using " $k$ ", the constant of proportionality. <br> Students will review the KS4 course to date including year 9 before completing and in class examination style test. | Practice book chapter 14 <br> - Percentages - increase, decrease, compound, reverse <br> - Conversions <br> - Speed <br> - Density <br> - Exam questions (assessed) |
|  | Nature of Landmark Assessment | A 35 minute tests at the end of each topic will be averaged to give a grade for the half term. |  |


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| :---: | :---: | :---: | :---: |
|  | Construction Loci and Bearings <br> Revision | Students should be able to: Recall properties of quadrilaterals and other 2D shapes; sketch nets of 3D shapes; recognise 3D shapes and their properties; describe 3D shapes using the correct mathematical words; draw lines of symmetry; identify rotational symmetry; identify and sketch planes of symmetry in 3D shapes; draw plans and elevations of 3D shapes; sketch 3D shapes based on their plans and elevations; construct ASA, SAS, SSS and RHS triangles; identify congruent triangles; construct angles; draw diagrams to scale; use scales on maps and diagrams to work out lengths and distances; make accurate drawings of nets of common 3D shapes; constructing an isosceles trapezium; construct a regular hexagon; bisect angles and lines using a ruler and compass; use a ruler and compass to construct 60, 45, 30 degrees; draw loci for the path of points that follow a given rule; identify regions bounded by loci to solve practical problems; angles in parallel lines; find and use 3-figure bearings; use angles at parallel lines to calculate bearings. <br> Revision of key topic areas identified throughout the year by topic tests analysis. Past paper practice for both non calculator and calculator examinations. | Practice book chapter 7 <br> - Scale drawings <br> - Loci <br> - Bearings <br> - Exam questions (assessed) <br> 1 Past examination paper per week. |
|  | Nature of Landmark Assessment | A 35 minute tests at the end of each topic will be averaged to give a grade for the half term. |  |


|  | Topic and approximate duration | Key Learning Areas | Homework Options <br> Students will be guided by the class teacher as to which level to complete (according to target level) |
| :---: | :---: | :---: | :---: |
|  | Quadratic Equations and Graphs | Students should be able to: Multiplying double brackets; recognising quadratic equations; square single brackets; plot graphs of quadratic functions; use quadratic graphs to solve problems; factorise quadratic expressions; solve quadratic functions algebraically. | Practice book chapter 16 <br> - Expanding <br> - Plotting quadratics <br> - Using and memorising the quadratic formula <br> - Factorising <br> - Exam questions (assessed) |
|  | Nature of Landmark Assessment | A 35 minute tests at the end of each topic will be averaged to give a grade for the half term. |  |


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| :---: | :---: | :---: | :---: |
|  | Circle, Cylinders, Cones and Sphere <br> Fractions, Indices and Standard From | Students should be able to: Round accurately to a given number of significant figures or decimal place; rearrange equations; calculate the circumference of a circle; solve problems involving the circumference of a circle; calculate the circumference and radius of a circle; work out percentage error intervals; evaluate squares and square roots; substitute into formulae and solve for the unknown; work out the area of a circle; work out the radius or diameter of a circle; solve problems involving the area of a circle; give answers in terms of $\pi$; simplify fractions; work out areas of semicircles and quarter circle and perimeters; solve problems involving sectors of circles; work out the volume and surface area of cylinders; work out the volume and surface area of a pyramid; work out the volume and surface area of a cone; work out the length of the hypotenuse using Pythagoras' theorem; work out the volume, surface area of a sphere. <br> Students should be able to: Converting between top heavy fractions and mixed numbers; multiply and divide mixed numbers and fraction; solve fractions questions in context; find reciprocals of decimals and mixed numbers; to know and use the laws of indices; write reciprocals in index form; use a calculator to find the values of number in index form; write large numbers in standard form; write small numbers in standard form. | Practice book chapter 17 <br> - Using area volume <br> - Surface area formulae <br> - Exam questions (assessed) <br> Practice book chapter 18 <br> - Standard form <br> - Exam questions (assessed) |
|  | Nature of Landmark Assessment | A set of 3 end of year examinations in line with expected GCSE papers |  |

## Year 10 Maths Course Outline

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| :---: | :---: | :---: | :---: |
|  | Equations and inequalities <br> Multiplicative Reasoning | Students should be able to: Expanding double brackets; to be able to factorise quadratics; to be able to find the roots of quadratic equations by factorising; non monic factorisation; completing the square of nonmonic; connection with key points on the graph; problems that require students to set up and solve a pair of simultaneous equations in a real-life context; use simultaneous equations to find the equations of a straight line; solve quadratic equations; use a calculator to evaluate surds; to be able to use the quadratic formula to solve quadratic equations; be able to complete the square for a quadratic equation; to be able to solve a quadratic equation by completing the square; recap changing the subject of an equation; solve simultaneous equations where one is linear and one is a quadratic; use real life situation to construct linear and quadratic equations and solve them; recap inequality notation; to be able to solve inequalities and show the solution on a number line. <br> Students should be able to: Divide using a ratio; express a multiplicative relationship between two quantities as a ratio or a fraction; reason best financial product; product where interest rate changes after 1 or 2 years; solve proportion problems using the unitary method; work out which product offers best value and consider rates of pay; work out the multiplier for repeated proportional change as a single decimal number; represent repeated proportional change using a multiplier raised to a power, use this to solve problems involving compound interest and depreciation; convert between metric speed measures; convert between density measures; convert between pressure measures; use kinematics formulae from the formulae sheet to calculate speed, acceleration, etc; calculate an unknown quantity from quantities that vary in direct or inverse proportion; set up and use equations to solve word and other problems involving direct and inverse proportion; recognise when values are in direct and inverse proportion by reference to the graph form, and use a graph to find the value of $k$; relate algebraic solutions to graphical representation of the equations | Higher practice book Chapter 9 <br> - Surds <br> - Factorising monic <br> quadratics <br> Solving sim equations <br> Completing the <br> square <br> Using the quadratic formula <br> Exam questions (assessed) <br> Higher practice book Chapter 11 <br> Repeated percentage change <br> - Direct and indirect proportion <br> - Problems involving compound measures <br> - Memorising conversions <br> - Exam questions (assessed) |
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|  | Topic and approximate duration | Key Learning Areas | Homework Options Students will be guided by the class teacher as to which level to complete (according to target level) |
| :---: | :---: | :---: | :---: |
|  | Similarity and congruence <br> More Trigonometry | Students should be able to: Find missing angles in parallel lines and triangles; explain that two triangles are congruent; and state the conditions of congruence; prove that shapes are congruent supporting each point with a mathematical justification and to state the condition used; use geometric properties to prove congruency and hence prove further properties such as bisecting diagonals or proving where a midpoint lies; enlarge shapes by scale factors including fractions and mixed numbers; identify corresponding sides; use the ratio of corresponding sides to work out scale factors; discuss why both methods are fundamentally the same; use similarity to find missing lengths; state conditions of similarity; use angles in parallel lines to prove similarity; use similar triangles to work out lengths in real life; find the area of 2 similar shapes; use the link between linear scale factor and area scale factor to solve problems; find the areas of similar shapes given the length scale factor; use the link between scale factors for length, area and volume to solve problems. <br> Students should be able to: Use SOH CAH TOA to find missing lengths and angles; to understand and use upper and lower bounds in calculations involving trigonometry; forming and solving equations using sine and cosine rules; consider transformations of functions to find exact values of $3 \cos (x),-\cos (x)$ or $\sin (x / 2)$; explain why $\sin (x)=\sin (180-x)$ for all value of $x$; prove the cosine rule by dropping a perpendicular; to know the graph of the Sine function and use it to solve equations; recap exact values of sine/cosine/tangent 30, 45, 60, 90; to know the graph of the Cosine function and use it to solve equations; to know the graph of the Tangent function and use it to solve equations; find the area of a triangle and the sector of a circle; to find the area of a non-right angled triangle using 1/2abSin(C); to find the area of a segment of a circle; use Pythagoras' theorem in 3D; use trigonometry in 3D; transformations of trigonometric graphs $f(x)+a f(x+a), a f(x)$ and $f(a x)$. | Higher practice book Chapter 12 <br> Memorising <br> conditions of congruency <br> and similarity and <br> geometric properties of triangles and quadrilaterals <br> Proving congruency <br> and similarity <br> Exam questions (assessed) <br> Higher practice book Chapter 13 <br> Learning the graphs of Sine Cosine and Tangent <br> - Use sine and cosine rules to find missing lengths and angles <br> - Learn transformations <br> - Exam questions (assessed) |
|  | Nature of <br> Landmark <br> Assessment | 35 minute tests at the end of each topic will be averaged to give a grade for the half term. |  |


|  | Topic and approximate duration | Key Learning Areas | Homework Options <br> Students will be guided by the class teacher as to which level to complete (according to target level) |
| :---: | :---: | :---: | :---: |
|  | Cumulative frequency, boxplots and histograms | Students should be able to: Understand how different sample sizes may affect the reliability of conclusions drawn; understand what is meant by a sample and a population; specify the problem and plan, decide what data to collect and what analysis is needed; understand primary and secondary data sources; identify possible sources of bias and plan to minimise it, write questionnaire questions to eliminate bias, and on timing and location of survey to ensure sample is representative ; select and justify a sampling scheme and a method to investigate a population; know the definition of random sampling; use random numbers to get a sample; know the definition and state it in terms of proportion, fraction, percentage or ratio; know the definition of random sampling; know the definition and state it in terms of proportion, fraction, percentage or ratio; construct and interpret cumulative frequency graphs/diagrams and from the graph: estimate frequency greater/less than a given value; find the median and quartile values and interquartile range; compare two cumulative frequency; compare the mean and range of two distributions, or median and interquartile range, as appropriate; produce box plots from raw data, when given quartiles, median and from cumulative frequency and identify any outliers; construct and interpret histograms from class intervals with unequal width; use and understand frequency density; estimate the mean from a histogram; estimate the median from a histogram with unequal class widths. <br> Students will review the KS4 course to date including year 9 before completing and in class examination style test. | Higher practice book Chapter 14 <br> - Learn key terms <br> - Represent data in cumulative frequency diagrams <br> - And histograms <br> - Exam questions (assessed) |
|  | Nature of Landmark Assessment | 35 minute tests at the end of each topic will be averaged to give a grade for the half term. |  |


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| :---: | :---: | :---: | :---: |
|  | Equations and graphs <br> Revision | Students should be able to: Solve quadratics by factorising; form and solve linear simultaneous equations; solve linear simultaneous equations graphically; recap graph of circle; recap plotting quadratics; solve simultaneous equations involving circles and parabolas graphically; represent inequalities on graphs; interpret graphs of inequalities; factorise and solve quadratics; use graphs to identify solutions to quadratic inequalities; sketch quadratics and use to solve quadratic inequalities; find the co-ordinates of a turning point by completing the square; use completed square form to identify and justify how many roots a quadratic equations has; find approximate solutions to quadratic equations graphically; change the subject of an equations; solve quadratic equations using an iterative process; expand triple brackets; identify positive and negative cubic functions; using $x$ and $y$ intercepts sketch the graphs of cubic functions expressed as a product of 3 linear expressions; identify how many solutions a cubic graph has by considering repeated roots; use an iterative process to find a root of a cubic equation to a given number of d.p's. <br> Revision of key topic areas identified throughout the year by topic tests analysis. Past paper practice for both non calculator and calculator examinations. | Higher practice book Chapter 15 <br> - Solving simultaneous equations <br> - Completing the square <br> - Expanding triple brackets <br> - Use the iterative process to find a root of a cubic <br> - Exam questions (assessed) |
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| :---: | :---: | :---: | :---: |
|  | Circles | Students should be able to: Recall the definition of a circle and identify and draw parts of a circle, including sector, tangent, chord, segment; use the facts that the angle subtended by an arc at the centre of a circle is twice the angle subtended at any point on the circumference, the angle in a semicircle is a right angle, the perpendicular from the centre of a circle to a chord bisects the chord, angles in the same segment are equal, alternate segment theorem, opposite angles of a cyclic quadrilateral sum to $180^{\circ}$, the tangent at any point on a circle is perpendicular to the radius at that point, tangents from an external point are equal in length to find missing angles on a diagram; prove these facts; prove a line is a tangent ; recognise and construct the graph of a circle centred at the origin of coordinates; find the equation of a tangent to a circle at a given point, by finding the gradient of the radius that meets the circle at that point (circles all centre the origin). | Higher practice book Chapter 16 <br> - Learning theorems <br> - Mixed questions finding missing angles <br> - Recap $y=m x+c$ <br> - Find the equation of a tangent to a circle at a point <br> - Exam questions (assessed) |
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| :---: | :---: | :---: | :---: |
|  | Formulae, Algebraic fractions, Surds and Proof <br> Vectors and Geometric proof | Students should be able to: Multiply surds; multiply two expressions containing surds; rationalise expressions using the difference of two squares; simplify fractions containing one or more non monic quadratics; change the subject of a formula such as, where all variables are in the denominators; find the inverse of complex functions; adding and subtracting surds; rationalise the denominator involving surds; simplify algebraic fractions including 2 monic quadratics; multiply and divide algebraic fractions; solve quadratic equations arising from algebraic fraction equations; change the subject of a formula, including cases where the subject occurs on both sides of the formula, or where a power of the subject appears; solve 'Show that' and proof questions using consecutive integers; use function notation; find the inverse of a linear function <br> Students should be able to: Understand and use vector notation, including column notation, and understand and interpret vectors as displacement in the plane with an associated direction; understand that 2a is parallel to a and twice its length, and that a is parallel to -a in the opposite direction; represent vectors, combinations of vectors and scalar multiples in the plane pictorially; calculate the sum of two vectors, the difference of two vectors and a scalar multiple of a vector using column vectors; multiplying vectors (including algebraic terms); produced geometrical proofs to prove points are collinear and vectors/lines are parallel; find the length of a vector using Pythagoras' Theorem; calculate the resultant of two vectors; solve geometric problems in 2D where vectors are divided in a given ratio. | Higher practice book Chapter 17 <br> - Algebraic fractions <br> - Solving quadratics <br> - Simplifying and rationalising surds <br> - Finding composite and inverse functions <br> - Proof questions <br> - Exam questions (assessed) <br> Higher practice book Chapter 18 <br> - Calculating resultant vectors <br> - magnitudes of vectors <br> - Exam questions (assessed) |
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