

## TCS KS4 Maths Curriculum

### KS4

Exam Board:	Edexcel
Course Title:	Mathematics GCSE
QAN:	601/4700/3
Examination dates:	3 papers (foundation or Higher) May to June TBC

### Year 10 (Foundation)

	Outline of Course/SOW delivery	Key Assessments	Skill Development
Autumn 1	Shape and graphing <ul style="list-style-type: none"> <li>Perimeter and area</li> <li>3D forms and volume</li> <li>real life graphs</li> <li>straight line graphs</li> </ul>	Topic tests and end of unit tests	<a href="#">See appendix for skill on department schemes of work.</a>
Autumn 2	Shape and Space <ul style="list-style-type: none"> <li>transformations: translations, rotations and reflections</li> <li>transformations: enlargements and combinations</li> </ul>	Topic tests and end of unit tests	
Spring 1	Number and geometry <ul style="list-style-type: none"> <li>ratio</li> <li>proportion</li> </ul>	Topic tests and end of unit tests	

	<ul style="list-style-type: none"> <li>● right angled triangles: pythagoras and trigonometry</li> <li>● probability 1</li> </ul>		
Spring 2	Data, shape and space <ul style="list-style-type: none"> <li>● probability 2</li> <li>● multiplicative reasoning</li> <li>● plans and elevations</li> </ul>	Topic tests and end of unit tests	
Summer 1	Geometry Algebra <ul style="list-style-type: none"> <li>● constructions, loci and bearings</li> <li>● quadratic equations: expanding and factorising</li> <li>● quadratic equations: graphs</li> </ul>	Topic tests and end of unit tests	
Summer 2	Algebra and advanced number <ul style="list-style-type: none"> <li>● circles, cylinders, cones and spheres</li> <li>● fractions and reciprocals</li> <li>● indices and standard form</li> </ul>	End of year test	

### Year 10 (Higher)

	<b>Outline of Course/SOW delivery</b>	<b>Key Assessments</b> <i>(End point task)</i>	<b>Skill Development</b> <i>(How does this unit build on prior knowledge?)</i>
Autumn 1	Shape and application of number <ul style="list-style-type: none"> <li>● Perimeter, area and circles</li> <li>● 3D forms and volume, cylinders, cones and spheres</li> <li>● accuracy and bounds</li> </ul>	Topic tests and end of unit tests	<a href="#">See appendix for skill on department schemes of work.</a>

Autumn 2	<p>Shape and Space</p> <p>Advanced algebra</p> <ul style="list-style-type: none"> <li>● transformations</li> <li>● constructions, loci and bearings</li> <li>● solving quadratic and simultaneous equations</li> <li>● inequalities</li> </ul>	Topic tests and end of unit tests	
Spring 1	<p>Number</p> <ul style="list-style-type: none"> <li>● probability</li> <li>● multiplicative reasoning</li> </ul>	Topic tests and end of unit tests	
Spring 2	<p>Shape, space and algebra</p> <ul style="list-style-type: none"> <li>● similarity and congruence in 2D and 3D</li> <li>● Graphs of trigonometric functions</li> <li>● further trigonometry</li> </ul>	Topic tests and end of unit tests	
Summer 1	<p>Geometry</p> <p>Algebra</p> <ul style="list-style-type: none"> <li>● quadratics, expanding more than two brackets, sketching graphs of circles cubes and quadratics</li> <li>● circle theorems</li> <li>● Circle geometry</li> <li>● changing the subject of formula</li> <li>brackets more complex closed brackets, algebraic fractions, solving equations arising from formula</li> </ul>	Topic tests and end of unit tests	
Summer 2	Proof	End of year test	

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|--|-------------------------------------------------------------------------------|--|--|
|  | <ul style="list-style-type: none"><li>• vectors and geometric proof</li></ul> |  |  |
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## Year 11 (Foundation)

	Outline of Course/SOW delivery	Key Assessments	Skill Development
Autumn 1	Shape and space <ul style="list-style-type: none"> <li>• similarity and congruence in 2D</li> <li>• vectors</li> </ul>	unit tests	<a href="#">See appendix for skill on department schemes of work.</a>
Autumn 2	Advanced algebra <ul style="list-style-type: none"> <li>• rearranging equations, graphs of cubic and reciprocal functions</li> <li>• simultaneous equations</li> </ul>	PPE	
Spring 1	Basics review <ul style="list-style-type: none"> <li>• Review of basic number and algebra work to ensure 'foundation blocks' are secure.</li> </ul>	PPE	
Spring 2	Exam technique and practice  Application of skill to specific exam work. Practising applying key skills to exam style questions.	regular past-papers	
Summer 1			
Summer 2			

## Year 11 (Higher)

	Outline of Course/SOW delivery	Key Assessments	Skill Development
Autumn 1	Advanced algebra <ul style="list-style-type: none"> <li>reciprocal and exponential graphs</li> <li>Gradients under graphs</li> </ul>	unit tests	<a href="#">See appendix for skill on department schemes of work.</a>
Autumn 2	Advanced algebra <ul style="list-style-type: none"> <li>direct and inverse proportion</li> </ul>	PPE	
Spring 1	Basics review <ul style="list-style-type: none"> <li>Review of basic number and algebra work to ensure 'foundation blocks' are secure.</li> </ul>	PPE	
Spring 2	Exam technique and practice.  Application of skill to specific exam work. Practising applying key skills to exam style questions.	regular past-papers	
Summer 1			
Summer 2			

Year 10 – Foundation

8	a	Perimeter and area	Autumn Term Yr10	Recognise the formulae for area of sectors in a circle.	Recognise the formulae for length of arcs in a circle.	Find the perimeters and areas of semicircles and quarter circles	Use the formulae for the circumference and area of a circle, given the circumference or area, to calculate the radius or diameter
	b	3D forms and volume		Calculate the lengths and areas given the volumes in right prisms	Find the surface area of simple shapes (prisms) using the formulae for triangles and rectangles, and other shapes	Calculate the lengths, areas and volumes in cylinders	Calculate the surface area of right prisms

9	a	Real-life graphs		Interpret gradient as rate of change in distance-time and speed-time graphs, containers emptying and filling and unit price graphs	Know that the gradient of a line is the change in y over change in x.	Know that the gradient of a velocity time graph represents acceleration	Interpret distance-time graphs and calculate the speed of individual sections, total distance and total time	Interpret the gradient of a straight line graph as a rate of change		
	b	Straight-line graphs		Find the equation of a straight-line from its graph	Find the equation of a real-life straight line graph that goes through the origin	Identify and interpret gradient and y intercept from an equation $y=mx+c$	Plot and draw graphs of straight lines using a table of values given in the form $ax + by = c$	Identify parallel lines from their equations where they have to be rearranged first	Without drawing the graphs, compare and contrast features of graphs such as $y = 4x$ , $y = 4x + 6$ , $y = x + 6$ , $y = -4x$ , $y = x - 6$	Plot and draw graphs of straight lines WITHOUT using a table of values (use intercept and gradient)
10	a	Transformations I: translations, rotations and reflections		Describe a transformation	Transform 2D shapes by a more complex combinations of rotations, reflections and translations, e.g. a reflection, followed by a rotation etc.	Translate a shape using a vector	Find the centre of rotation			



	b	Transformations II: enlargements and combinations		Describe an enlargement using the scale factor and the centre of enlargement where the scale factor is a positive fraction	Enlarge a 2D shape given a negative scale factor about a centre (0,0)	Enlarge 2D shapes, given a fractional scale factor with a centre of enlargement other than (0,0)				
11	a	Ratio	Spring Term Yr10	Use measures in ratio and proportion problems (currency conversion, rates of pay, best value)	Compare ratios by changing them to the form 1 : m or m : 1	Interpret and write ratios to describe a situation	Divide a quantity into more than two parts in a given ratio	Solve a ratio problem in context	Simplify a ratio expressed in different units	Express a multiplicative relationship between two quantities as a ratio or a fraction
	b	Proportion		Set up equations to show direct proportion	Use expressions of the form $y \propto x$	Use expressions of the form $y \propto \frac{1}{x}$	Use algebraic methods to solve problems involving variables in direct proportion			
12		Right-angled triangles: Pythagoras and trigonometry	Spring Term Yr10	Given the coordinates of points A and B, calculate the length of AB	Justify if a triangle is right-angled given its three lengths	Know the formula for Pythagoras' theorem and use to find the hypotenuse	Begin to use the trigonometric ratios to find the size of an angle in a right-angled triangle	Know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and $90^\circ$ ; know the exact value of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and $60^\circ$	Use and apply Pythagoras' theorem to solve problems in 2D	Use the sine, cosine and tangent ratios to find the lengths of unknown sides in a right-angled triangle, using straightforward algebraic manipulation, e.g. calculate the adjacent (using cosine), or the opposite (using sine or tangent ratios)



	b	Quadratic equations: graphs		Construct a table of values, including negative values of x for a function such as $y = ax^2$	Identify and interpret roots, intercepts and turning points of a quadratic graph	Recognise a graph which represents a quadratic function	Identify the line of symmetry of a quadratic graph						
17		Circles, cylinders, cones and spheres		Calculate the lengths and areas given the volumes in right prisms	Find the surface area of simple shapes (prisms) using the formulae for triangles and rectangles, and other shapes	Calculate the lengths, areas and volumes in cylinders	Calculate the surface area of right prisms	Calculate volumes of shapes made from cuboids, for lengths given as whole numbers	Recognise the formulae for area of sectors in a circle.	Recognise the formulae for length of arcs in a circle.	Find the perimeters and areas of semicircles and quarter circles	Use the formulae for the circumference and area of a circle, given the circumference or area, to calculate the radius or diameter	
	a	Fractions and reciprocals											
18	b	Indices and standard form		Use the index laws to include negative power answers and understand that these answers are smaller than 1	Calculate with roots (surds - exact values)	Use the laws of indices to multiply and divide numbers written in index notation	Use the laws of indices for a number written in index form raised to a power e.g. $(3^2)^4$	Interpret a calculator display using standard form	Convert between large and small numbers into standard form and vice-versa	Recognise numbers written in standard form	Order numbers written in standard index form		

Year 10 – higher

7	a	Perimeter, area and circles	Autumn Term YR10	Recognise the formulae for area of sectors in a circle.	Recognise the formulae for length of arcs in a circle.	Find the perimeters and areas of semicircles and quarter circles	Use the formulae for the circumference and area of a circle, given the circumference or area, to calculate the radius or diameter		
	b	3D forms and volume, cylinders, cones and spheres		Calculate the lengths and areas given the volumes in right prisms	Find the surface area of simple shapes (prisms) using the formulae for triangles and rectangles, and other shapes	Calculate the lengths, areas and volumes in cylinders	Calculate the surface area of right prisms	Calculate volumes of shapes made from cuboids, for lengths given as whole numbers	
	c	Accuracy and bounds		Identify the upper and lower bounds of a measurement	Calculate the upper and lower bounds of 2-D measurements involving addition e.g. perimeter	Use inequality notation to specify simple error intervals due to truncation or rounding			
8	a	Transformations		Describe an enlargement using the scale factor and the centre of enlargement where the scale factor is a positive fraction	Describe a transformation	Enlarge a 2D shape given a negative scale factor about a centre (0,0)	Transform 2D shapes by a more complex combinations of rotations, reflections and translations, e.g. a reflection, followed by a rotation etc.	Enlarge 2D shapes, given a fractional scale factor with a centre of enlargement other than (0,0)	Find the centre of rotation

	b	Constructions, loci and bearings		Construct angles of $60^\circ$ , $90^\circ$ , $30^\circ$ , $45^\circ$	Use straight edge and compass to construct the perpendicular from or to a point on a line segment	Mark on a diagram the position of point B given its bearing from the point A	Produce shapes and paths by using descriptions of loci	Use accurate drawing to solve bearings problems	Use straight edge and compasses to construct a triangle, given right angle, hypotenuse and side (RHS)
9	a	Solving quadratic and simultaneous equations		Solve simple quadratic equations algebraically by factorising	Solve simultaneous equation, linear/linear simultaneous equations, where neither or one equation needs multiplying	Write simultaneous equations to represent a situation	Factorise quadratic expressions of the form $ax^2 + bx + c$ where $a = 1$ , including the difference of two squares		
	b	Inequalities		Solve more complex linear inequalities in one variable and represent the solution on a number line e.g. $-6 < 2n+4$ or $-9 < 2n + 3 < 7$	Represent the solution set for inequalities using set notation	Solve more complex linear inequalities in one variable where the unknown is on both sides of the inequality			
10		Probability	Spring Term Yr10	Understand and use set notation	Complete a probability tree diagram for dependent events understanding replacement and non replacement	Record outcomes of events in a Venn Diagram	Draw a frequency tree based on given information and use this to find probability and expected outcome	Understand and use $P(A \text{ and } B) = P(A) \times P(B)$ for independent events	

11		Multiplicative reasoning		Use calculators to explore exponential growth and decay	Use graphs to calculate measures including unit price, average speed, distance, time, acceleration	Convert between area measures (e.g. mm <sup>2</sup> to cm <sup>2</sup> , cm <sup>2</sup> to m <sup>2</sup> , and vice versa)	Estimate conversions	Extend to simple conversions of compound measures (e.g. convert 2 m/s to km/hr)	Understand and use compound measures (density, speed, pressure)
12		Similarity and congruence in 2D and 3D		Begin to use congruency to solve simple problems in triangles and quadrilaterals	Use similarity to solve problems in 2D shapes	Find the scale factor of similar shapes where the scale factor is a fraction	Use simple examples of the relationship between enlargement and areas and volumes of simple shapes and solids	Use the information given about the length of sides and sizes of angles to determine whether triangles are congruent, or similar	Write lengths, areas and volumes of two shapes as ratios in simplest form
13	a	Graphs of trigonometric functions							
	b	Further trigonometry							
test week	25th Feb								
purple week	11th March								
14	a	Collecting data	Summer Term Yr10	Know the definition of random sampling	Write questionnaire questions to eliminate bias, on timing and location of survey to ensure sample is representative				

	b	Cumulative frequency, box plots and histograms		Construct cumulative frequency tables	Interpret box plots to find median, quartiles, range and interquartile range and draw conclusions	Calculate the interquartile range of a set of discrete data		
15		Quadratics, expanding more than two brackets, sketching graphs, graphs of circles, cubes and quadratics		Solve linear/linear simultaneous equations graphically				
16	a	Circle theorems						
	b	Circle geometry						
17		Changing the subject of formulae (more complex), algebraic fractions, solving equations arising from algebraic fractions, rationalising surds, proof		Multiply and simplify algebraic fractions	Given $f(x)$ find $f(a)$ where $a$ is an integer or fraction	Given $f(x)$ where $f(x)$ is a linear function, find $a$ when $f(a) =$ whole number	In simple cases, change the subject of the formula, e.g. make $c$ the subject of the formula from $y = mx + c$	
18		Vectors and geometric proof		Express points as position vectors	Add and Subtract column vectors	Represent column vectors graphically	Calculate scalar multiples of column vectors	Understand and use vector notation

## Year 11 – Foundation

19	a	Similarity and congruence in 2D	Autumn Term Yr11	Begin to use congruency to solve simple problems in triangles and quadrilaterals	Use similarity to solve problems in 2D shapes	Find the scale factor of similar shapes where the scale factor is a fraction	Use simple examples of the relationship between enlargement and areas and volumes of simple shapes and solids	Use the information given about the length of sides and sizes of angles to determine whether triangles are congruent, or similar	Write lengths, areas and volumes of two shapes as ratios in simplest form
	b	Vectors		Express points as position vectors	Add and Subtract column vectors	Represent column vectors graphically	Calculate scalar multiples of column vectors	Understand and use vector notation	
20		Rearranging equations, graphs of cubic and reciprocal functions and simultaneous equations		In simple cases, change the subject of the formula, e.g. make c the subject of the formula from $y = mx + c$	Generate points and plot graphs of simple cubic functions, then more general functions	Solve linear/linear simultaneous equations graphically			

### Year 11 – Higher

19	a	Reciprocal and exponential graphs; Gradient and area under graphs	Autumn Term Yr11	Use expressions of the form $y \propto x$	Use expressions of the form $y \propto 1/x$	Use algebraic methods to solve problems involving variables in direct proportion
	b	Direct and inverse proportion				