Mapping U.S. Common Core State Standards for Mathematics to Cambridge IGCSE® 0444 Mathematics

University of Cambridge International Examinations has mapped the Common Core State Standards (CCSS) for Mathematics to the syllabus for **Cambridge IGCSE Mathematics (0444) (US)**. This document shows where the standards are covered in the syllabus and references are made to the curriculum content on pages 8 to 33 of the Syllabus.

There are two levels of achievement in Cambridge IGCSE Mathematics, via two separate routes: core and extended. In this document we have differentiated between what is covered in the core and what is covered in the extended curriculum content.

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Mathematics: High School–Number and Quantity

Common Core State Standards – The Real Number System		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of work
Extend the properties of exponents to rational exponents				
N-RN1	1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)^3}$ to hold, so $(5^{1/3})^3$ must equal 5.	Meaning and calculation of exponents (powers, indices) including positive, negative, and zero exponents. Rules for exponents. Scientific Form (Standard Form) $a \times 10^n$ where $1 \leq a < 10$ and n is an integer. **Number C1.7**	Meaning and calculation of exponents (powers, indices) including positive, negative, and zero exponents. Rules for exponents. Scientific Form (Standard Form) $a \times 10^n$ where $1 \leq a < 10$ and n is an integer. **Number E1.7**	Unit 1 – Number (Core) Unit 1 – Number (Extended)
N-RN2	2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.	Meaning and calculation of exponents (powers, indices) including positive, negative, and zero exponents. Rules for exponents. Scientific Form (Standard Form) $a \times 10^n$ where $1 \leq a < 10$ and n is an integer. **Number C1.7**	Meaning and calculation of exponents (powers, indices) including positive, negative, and zero exponents. Rules for exponents. Scientific Form (Standard Form) $a \times 10^n$ where $1 \leq a < 10$ and n is an integer. **Number E1.7**	Unit 1 – Number (Core) Unit 1 – Number (Extended)

Common Core State Standards – The Real Number System		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Use properties of rational and irrational numbers				
N-RN3	3. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.		Knowledge of: natural numbers, integers (positive, negative, and zero), prime numbers, square numbers, rational and irrational numbers, real numbers. Use of symbols: =, ≠, ≤, ≥, <, >. **Number E1.1**	Unit 1 – Number (Extended)
Common Core State Standards - Quantities				
Reason quantitatively and use units to solve problems				
N-Q1	1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	Quantities—choose and interpret units and scales, define appropriate quantities (including money). **Number C1.9**	Quantities—choose and interpret units and scales, define appropriate quantities (including money). **Number E1.9**	Unit 1 – Number (Core) Unit 1 – Number (Extended)
N-Q2	2. Define appropriate quantities for the purpose of descriptive modeling.	Quantities–choose and interpret units and scales, define appropriate quantities (including money). **Number C1.9**	Quantities–choose and interpret units and scales, define appropriate quantities (including money). **Number E1.9**	Unit 1 – Number (Core) Unit 1 – Number (Extended)

Common Core State Standards - Quantities		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Reason quantitatively and use units to solve problems				
N-Q3	3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Estimating, rounding, decimal places, and significant figures–choose a level of accuracy appropriate for a problem. **Number C1.9**	Estimating, rounding, decimal places, and significant figures–choose a level of accuracy appropriate for a problem. **Number E1.9**	Unit 1 – Number (Core) Unit 1 – Number (Extended)
Common Core State Standards - The Complex Number System				
Perform arithmetic operations with complex numbers				
N-CN1	1. Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	*These standards are covered in the Additional Mathematics (US) syllabus and the AS Mathematics (US) syllabus.*		
N-CN2	2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.			
N-CN3	3. (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.	*This standard is covered in the Additional Mathematics (US) syllabus.*		
Represent complex numbers and their operations on the complex plane				
N-CN4	4. (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.	*This standard is covered in the Additional Mathematics (US) syllabus.*		

Common Core State Standards - The Complex Number System		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Represent complex numbers and their operations on the complex plane				
N-CN5	5. (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, $(-1 + \sqrt{3}\,i)3 = 8$ because $(-1 + \sqrt{3}\,i)$ has modulus 2 and argument 120°.	*These standards are covered in the Additional Mathematics (US) syllabus.*		
N-CN6	6. (+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.			
Use complex numbers in polynomial identities and equations				
N-CN7	7. Solve quadratic equations with real coefficients that have complex solutions.	*These standards are covered in the Additional Mathematics (US) syllabus.*		
N-CN8	8. (+) Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.			
N-CN9	9. (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.			

Common Core State Standards - Vector and Matrix Quantities		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Represent and model with vector quantities				
N-VM1	1. (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., ***v***, $\|\boldsymbol{v}\|$, $\|\|\boldsymbol{v}\|\|$, *v*).	Vector Notation: a; directed line segment AB; component form. **Transformations and vectors C5.1**	Vector Notation: a; directed line segment AB; component form. Use appropriate symbols for vectors and their magnitudes. **Transformations and vectors E5.1**	Unit 5 – Transformations and Vectors (Core) Unit 5 – Transformations and Vectors (Extended)
N-VM2	2. (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.		Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point. Use position vectors. **Transformations and vectors E5.2**	Unit 5 – Transformations and Vectors (Extended)
N-VM3	3. (+) Solve problems involving velocity and other quantities that can be represented by vectors.	*This standard is covered in the Additional Mathematics (US) syllabus.*		

Common Core State Standards - Vector and Matrix Quantities		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Perform operations on vectors				
N-VM4	4. (+) Add and subtract vectors. a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. c. Understand vector subtraction $\boldsymbol{v} - \boldsymbol{w}$ as $\boldsymbol{v} + (-\boldsymbol{w})$, where $-\boldsymbol{w}$ is the additive inverse of $\boldsymbol{w}$, with the same magnitude as $\boldsymbol{w}$ and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.		Add and subtract vectors. **Transformations and vectors E5.4** Calculate the magnitude of a vector. **Transformations and vectors E5.5**	Unit 5 – Transformations and Vectors (Extended
N-VM5	5. (+) Multiply a vector by a scalar. a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$. b. Compute the magnitude of a scalar multiple $c\boldsymbol{v}$ using $\|c\boldsymbol{v}\| = \|c\|v$. Compute the direction of $c\boldsymbol{v}$ knowing that when $\|c\|v \neq 0$, the direction of $c\boldsymbol{v}$ is either along $\boldsymbol{v}$ (for $c > 0$) or against $\boldsymbol{v}$ (for $c < 0$).		Calculate the magnitude of a vector. **Transformations and vectors E5.3** Multiply a vector by a scalar. **Transformations and vectors E5.5**	Unit 5 – Transformations and Vectors (Extended
Perform operations on matrices and use matrices in applications				
N-VM6	6. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.	*These standards are covered in the Additional Mathematics (US) syllabus.*		
N-VM7	7. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.			
V-VM8	8. (+) Add, subtract, and multiply matrices of appropriate dimensions.			

Common Core State Standards - Vector and Matrix Quantities		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Perform operations on matrices and use matrices in applications				
N-VM9	9. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.	*These standards are covered in the Additional Mathematics (US) syllabus.*		
N-VM10	10. (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.			
N-VM11	11. (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.			
N-VM12	12. (+) Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.			

Mathematics: High School–Algebra

Common Core State Standards - Seeing Structure in Expressions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Interpret the structure of expressions				
A-SSE1	1. Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.	Identify terms, factors, and coefficients. **Algebra C2.7**	Identify terms, factors, and coefficients. Interpret algebraic expressions. **Algebra E2.7**	Unit 2 – Algebra (Core) Unit 2 – Algebra (Extended)
A-SSE2	2. Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2– y^2)(x^2 + y^2)$.	Factorization: common factor only. **Algebra C2.9**	Factorization: common factor; difference of squares; trinomial; four term. **Algebra E2.9**	Unit 2 – Algebra (Core) Unit 2 – Algebra (Extended)
Write expressions in equivalent forms to solve problems				
A-SSE3	3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. Use the properties of exponents to transform expressions for exponential functions. For example, the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%. * The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.		Create and solve quadratic equations by: inspection; factorization; using the quadratic formula or completing the square. **Algebra E2.11** Exponents (indices). **Algebra E2.4**	Unit 2 – Algebra (Extended)

Common Core State Standards - Seeing Structure in Expressions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Write expressions in equivalent forms to solve problems				
A-SSE4	4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.	*This standard is covered in the AS Mathematics (US) syllabus.*		

Common Core State Standards - Arithmetic with Polynomials and Rational Expressions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Perform arithmetic operations on polynomials				
A-APR1	1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	*This standard is covered in the Additional Mathematics (US) syllabus.*		
Understand the relationship between zeros and factors of polynomials				
A-APR2	2. Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x – a$ is $p(a)$, so $p(a) = 0$ if and only if $(x – a)$ is a factor of $p(x)$.	*These standards are covered in the Additional Mathematics (US) syllabus.*		
A-APR3	3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.			
Use polynomial identities to solve problems				
A-APR4	4. Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.	*This standard is covered in the Additional Mathematics (US) syllabus.*		

Common Core State Standards - Arithmetic with Polynomials and Rational Expressions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Perform arithmetic operations on polynomials				
A-APR5	5. (+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.	*This standard is covered in the AS Mathematics (US) syllabus.*		
Rewrite rational expressions				
A-APR6	6. Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.		*This standard is covered in the Additional Mathematics (US) syllabus, but covered to some extent by* ***Algebraic functions E2.10***	
A-APR7	7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.	*This standard is covered in the Additional Mathematics (US) syllabus*		

Common Core State Standards - Creating Equations		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Create equations that describe numbers or relationships				
A-CED1	1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.	Create expressions and create and solve linear equations, including those with fractional expressions. **Algebra C2.3**	Create and solve linear inequalities. **Algebra E2.2** Create expressions and create and solve linear equations, including those with fractional expressions. **Algebra E2.3** Solve simple rational and radical equations in one variable, and discount any extraneous solutions. **Algebra E2.12**	Unit 2 – Algebra (Core) Unit 2 – Algebra (Extended)
A-CED2	2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Create and solve simultaneous linear equations in two variables algebraically. **Algebra C2.6**	Create expressions and solve simultaneous linear equations in two variables algebraically and graphically. **Algebra E2.6**	Unit 2 – Algebra (Core) Unit 2 – Algebra (Extended)
A-CED3	3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non- viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.		Create and solve linear inequalities. **Algebra E2.2**	Unit 2 – Algebra (Extended)
A-CED4	4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.	Rearrangement and evaluation of formulae. **Algebra C2.5**	Rearrangement and evaluation of formulae. **Algebra E2.5**	Unit 2 – Algebra (Core) Unit 2 – Algebra (Extended)

Common Core State Standards - Reasoning with Equations and Inequalities		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Understand solving equations as a process of reasoning and explain the reasoning				
A-REI1	1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	Create expressions and create and solve linear equations, including those with fractional expressions. **Algebra C2.3**	Create expressions and create and solve linear equations, including those with fractional expressions. **Algebra E2.3**	Unit 2 – Algebra (Core) Unit 2 – Algebra (Extended)
A-REI2	2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.		Solve simple rational and radical equations in one variable, and discount any extraneous solutions. **Algebra E2.12**	Unit 2 – Algebra (Extended)
Solve equations and inequalities in one variable				
A-REI3	3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Create expressions and create and solve linear equations, including those with fractional expressions. **Algebra C2.3**	Create and solve linear inequalities. **Algebra E2.2** Create expressions and create and solve linear equations, including those with fractional expressions. **Algebra E2.3**	Unit 2 – Algebra (Core) Unit 2 – Algebra (Extended)

Common Core State Standards - Reasoning with Equations and Inequalities		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Solve equations and inequalities in one variable				
A-REI4	4. Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.		Create and solve quadratic equations by:inspection; factorization; using the quadratic formula or completing the square. **Algebra E2.11 (not complex solutions)**	Unit 2 – Algebra (Extended)
Solve systems of equations				
A-REI5	5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	Create and solve simultaneous linear equations in two variables algebraically. **Algebra C2.6 (proof will not be tested)**	Create expressions and solve simultaneous linear equations in two variables algebraically and graphically. **Algebra E2.6 (proof will not be tested)**	The proof aspect can be taught but will not be tested. The extended curriculum will focus on the use of this methodology to solve problems. Unit 2 – Algebra (Core) Unit 2 – Algebra (Extended)
A-REI6	6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	Create and solve simultaneous linear equations in two variables algebraically. **Algebra C2.6**	Create expressions and solve simultaneous linear equations in two variables algebraically and graphically. **Algebra E2.6**	Unit 2 – Algebra (Core) Unit 2 – Algebra (Extended)

Common Core State Standards - Reasoning with Equations and Inequalities		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Solve systems of equations				
A-REI7	7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.	*This standard is covered in the Additional Mathematics (US) syllabus.*		

Common Core State Standards - Reasoning with Equations and Inequalities		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Solve systems of equations				
A-REI8	8. (+) Represent a system of linear equations as a single matrix equation in a vector variable.	*These standards are covered in the Additional Mathematics (US) syllabus, but knowledge of the inverse 3 x 3 matrices will not be tested. Students will not be asked to solve linear equations.*		
A-REI9	9. (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).			
Represent and solve equations and inequalities graphically				
A-REI10	10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane. Construct tables of values for functions of the form $ax + b$, $\pm x^2 + ax + b$, a/x ($x \neq 0$) where a and b are integral constants; draw and interpret such graphs. Solve associated equations approximately by graphical methods. **Functions C3.2**	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane. Construct tables of values and construct graphs of functions of the form ax^n where a is a rational constant and $n = -2, -1, 0, 1, 2, 3$ and simple sums of not more than three of these and for functions of the type a^x where a is a positive integer. Solve associated equations approximately by graphical methods. **Functions E3.2**	Unit 3 – Functions (Core) Unit 3 – Functions (Extended)

Common Core State Standards - Reasoning with Equations and Inequalities		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Represent and solve equations and inequalities graphically				
A-REI11	11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$;find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane. Construct tables of values for functions of the form $ax + b$, $\pm x^2 + ax + b$, a/x ($x \neq 0$) where a and b are integral constants; draw and interpret such graphs. Solve associated equations approximately by graphical methods. **Functions C3.2**	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane. Construct tables of values and construct graphs of functions of the form ax^n where a is a rational constant and $n = -2, -1, 0, 1, 2, 3$ and simple sums of not more than three of these and for functions of the type a^x where a is a positive integer. Solve associated equations approximately by graphical methods. **Functions E3.2**	Unit 3 – Functions (Core) Unit 3 – Functions (Extended)
A-REI12	12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.		Graph the solutions to a linear inequality in two variables as a half-plane (region), excluding the boundary in the case of a strict inequality. Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. **Functions E3.13**	Unit 3 – Functions (Core) Unit 3 – Functions (Extended)

Mathematics: High School–Functions

Common Core State Standards - Interpreting Functions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Understand the concept of a function and use function notation				
F-IF1	1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and x is an element of its domain, then *f*(*x*) denotes the output of f corresponding to the input *x*. The graph of f is the graph of the equation *y* = *f*(*x*).	Use function notation. Knowledge of domain and range. Mapping diagrams. **Functions C3.1**	Use function notation. Knowledge of domain and range. Mapping diagrams. **Functions E3.1**	Unit 3 – Functions (Core) Unit 3 – Functions (Extended)
F-IF2	2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	Use function notation. Knowledge of domain and range. Mapping diagrams. **Functions C3.1**	Use function notation. Knowledge of domain and range. Mapping diagrams. **Functions E3.1**	Unit 3 – Functions (Core) Unit 3 – Functions (Extended)
F-IF3	3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by *f*(*0*) = *f*(*1*) = *1*, *f*(*n+1*) = *f*(*n*) + *f*(*n-1*) for *n* ≥ *1*.	*This standard is covered in the Additional Mathematics (US) syllabus.*		

Common Core State Standards - Interpreting Functions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Interpret functions that arise in applications in terms of the context				
F-IF4	4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.	Recognition of the following function types from the shape of their graphs: linear $f(x) = ax + b$, quadratic $f(x) = ax^2 + bx + c$, reciprocal $f(x) = a/x$ ($x \neq 0$). Interpret the key features of the graphs–to include intercepts; intervals where the function is increasing, decreasing, positive, negative; relative maxima and minima; symmetries; end behavior. **Functions C3.5**	Recognition of the following function types from the shape of their graphs:linear $f(x) = ax+ b$, quadratic $f(x) = ax^2 + bx+ c$, cubic $f(x) = ax^3 + bx^2 + cx + d$, reciprocal $f(x) = a/x$ ($x \neq 0$), exponential $f(x) = a^x$ with $0 < a < 1$ or $a > 1$, trigonometric $f(x) = \sin(bx)$; $\cos(bx)$; $\tan x$. Interpret the key features of the graphs–to include intercepts; intervals where the function is increasing, decreasing, positive, negative; relative maxima and minima; symmetries; end behavior and periodicity. **Functions E3.5**	Unit 3 – Functions (Core) Unit 3 – Functions (Extended)
F-IF5	5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **Functions C3.6**	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **Functions E3.6**	Unit 3 – Functions (Core) Unit 3 – Functions (Extended)

Common Core State Standards - Interpreting Functions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Interpret functions that arise in applications in terms of the context				
F-IF6	6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.		Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. **Functions E3.7**	Unit 3 – Functions (Extended)
Analyze functions using different representations				
F-IF7	7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane. Construct tables of values for functions of the form $ax + b$, $\pm x^2 + ax + b$, a/x ($x \neq 0$) where a and b are integral constants; draw and interpret such graphs. Solve associated equations approximately by graphical methods. **Functions C3.2** Recognition of the following function types from the shape of their graphs: linear $f(x) = ax +$	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane. Construct tables of values and construct graphs of functions of the form ax^n where a is a rational constant and $n = -2, -1, 0, 1, 2, 3$ and simple sums of not more than three of these and for functions of the type a^x where a is a positive integer. Solve associated equations approximately by graphical methods. **Functions E3.2** Recognition of the following function types from the	Unit 3 – Functions (Core) Unit 3 – Functions (Extended)

		b, quadratic $f(x) = ax^2 + bx + c$, reciprocal $f(x) = a/x$ ($x \neq 0$). Interpret the key features of the graphs—to include intercepts; intervals where the function is increasing, decreasing, positive, negative; relative maxima and minima; symmetries; end behavior. **Functions C3.5**	shape of their graphs:linear $f(x) = ax+ b$, quadratic $f(x) = ax^2 + bx+ c$, cubic $f(x) = ax^3 + bx^2 + cx + d$, reciprocal $f(x) = a/x$ ($x \neq 0$), exponential $f(x) = a^x$ with $0 < a < 1$ or $a > 1$, trigonometric $f(x)$ = asin(bx); acos(bx); tan$x$. Interpret the key features of the graphs—to include intercepts; intervals where the function is increasing, decreasing, positive, negative; relative maxima and minima; symmetries; end behavior and periodicity. **Functions E3.5**	
F-IF8	8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, and classify them as representing exponential growth or decay.	Write a function that describes a relationship between two quantities. **Functions C3.3**	Write a function that describes a relationship between two quantities. **Functions E3.3** Behavior of linear, quadratic, and exponential functions; linear $f(x) = ax+ b$, quadratic $f(x) = ax^2 + bx + c$, exponential $f(x) = a^x$ with $0 < a < 1$ or $a > 1$. **Functions E3.8**	Unit 3 – Functions (Core) Unit 3 – Functions (Extended)

Common Core State Standards - Interpreting Functions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Analyze functions using different representations				
F-IF9	9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.		Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). **Functions E3.4**	Unit 3 – Functions (Extended)

Common Core State Standards - Building Functions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Build a function that models a relationship between two quantities				
F-BF1	1. Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model. c. (+) Compose functions. For example, if $T(y)$ is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then $T(h(t))$ is the temperature at the location of the weather balloon as a function of time.		Simplification of formulae for composite functions such as $f(g(x))$ where $g(x)$ is a linear expression. **Functions E3.10**	
F-BF2	2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	Continuation of a sequence of numbers or patterns; recognize patterns in sequences; generalize to simple algebraic statements, including determination of the nth term. **Algebra C2.13**	Continuation of a sequence of numbers or patterns; recognize patterns in sequences; generalize to simple algebraic statements, including determination of the nth term. **Algebra E2.13**	Recursive notation will not be expected. Unit 2 – Algebra (Core) Unit 2 – Algebra (Extended)

Common Core State Standards - Building Functions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Build new functions from existing functions				
F-BF3	3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.	Description and identification, using the language of transformations, of the changes to the graph of $y = f(x)$ when y = $f(x) + k$, $y = k\,f(x)$, $y = f(x + k)$ for $f(x)$ **Functions C3.5** and **C3.12**	Description and identification, using the language of transformations, of the changes to the graph of $y = f(x)$ when $y = f(x) + k$, $y = k\,f(x)$, $y = f(x + k)$ for $f(x)$ **Functions E3.5** and **E3.12**	Unit 3 – Functions (Core) Unit 3 – Functions (Extended)
F-BF4	4. Find inverse functions. a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2x^3$ or $f(x) = (x + 1)/(x – 1)$ for $x \neq 1$. b. (+) Verify by composition that one function is the inverse of another. c. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse. d. (+) Produce an invertible function from a non-invertible function by restricting the domain.		Inverse function f^{-1}. **Functions E3.11 (excluding part *d*)**	Unit 3 – Functions (Extended)
F-BF5	5. (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	*This standard is covered in the Additional Mathematics (US) syllabus.*		

Common Core State Standards - Linear, Quadratic, and Exponential Models		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Construct and compare linear, quadratic, and exponential models and solve problems				
F-LE1	1. Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.		Behavior of linear, quadratic, and exponential functions; linear $f(x) = ax + b$, quadratic $f(x) = ax^2 + bx + c$, exponential $f(x) = a^x$ with $0 < a < 1$ or $a > 1$. **Functions E3.8**	Proof aspect will not be tested on IGCSE extended but can be taught when introducing the topic. It is expected that students will know and use this property however. Unit 3 – Functions (Extended)
F-LE2	2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).		Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). **Functions E3.9**	Unit 3 – Functions (Extended)
F-LE3	3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.		Behavior of linear, quadratic, and exponential functions; linear $f(x) = ax + b$, quadratic $f(x) = ax^2 + bx + c$, exponential $f(x) = a^x$ with $0 < a < 1$ or $a > 1$. **Functions E3.8**	Unit 3 – Functions (Extended)

Common Core State Standards - Linear, Quadratic, and Exponential Models		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Construct and compare linear, quadratic, and exponential models and solve problems				
F-LE4	4. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.	*This standard is covered in the Additional Mathematics (US) syllabus.*		
Interpret expressions for functions in terms of the situation they model				
F-LE5	5. Interpret the parameters in a linear or exponential function in terms of a context.	Recognition of the following function types from the shape of their graphs: linear $f(x) = ax + b$, quadratic $f(x) = ax^2 + bx + c$, reciprocal $f(x) = a/x$ ($x \neq 0$). Interpret the key features of the graphs—to include intercepts; intervals where the function is increasing, decreasing, positive, negative; relative maxima and minima; symmetries; end behavior. **Functions C3.5**	Recognition of the following function types from the shape of their graphs: linear $f(x) = ax + b$, quadratic $f(x) = ax^2 + bx + c$, cubic $f(x) = ax^3 + bx^2 + cx + d$, reciprocal $f(x) = a/x$ ($x \neq 0$), exponential $f(x) = a^x$ with $0 < a < 1$ or $a > 1$, trigonometric $f(x) = \sin(bx)$; $\cos(bx)$; $\tan x$ Interpret the key features of the graphs–to include intercepts; intervals where the function is increasing, decreasing, positive, negative; relative maxima and minima; symmetries; end behavior and periodicity. **Functions E3.5**	Unit 3 – Functions (Core) Unit 3 – Functions (Extended)

Common Core State Standards - Trigonometric Functions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Extend the domain of trigonometric functions using the unit circle				
F-TF1	1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	*These standards are covered in the Additional Mathematics (US) syllabus and the AS Mathematics (US) syllabus.*		
F-TF2	2. Explain how the unit circle in the coordinate plane enables the Extended of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.			
F-TF3	3. (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosine, and tangent for π–*x*, π+*x*, and 2π–*x* in terms of their values for *x*, where *x* is any real number.	*These standards are covered in the Additional Mathematics (US) syllabus.*		
F-TF4	4. (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.			
Model periodic phenomena with trigonometric functions				
F-TF5	5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	*This standard is covered in the Additional Mathematics (US) syllabus and the AS Mathematics (US) syllabus.*		
F-TF6	6. (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.	*This will not be directly tested.*		Will not be tested but may be taught when introducing the topic.
F-TF7	7. (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.	*This standard is covered in the Additional Mathematics (US) syllabus and the AS Mathematics (US) syllabus.*		

Common Core State Standards - Trigonometric Functions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Prove and apply trigonometric identities				
F-TF8	8. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.	*These standards are covered in the Additional Mathematics (US) syllabus, but the proof will not be directly tested.*		
F-TF9	9. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.			

Mathematics: High School–Geometry

Common Core State Standards - Congruence		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Experiment with transformations in the plane				
G-CO1	1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	Definitions: Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. **Geometry C4.2**	Definitions: Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. **Geometry E4.2**	Unit 4 – Geometry (Core) Unit 4 – Geometry (Extended)
G-CO2	2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).	Transformations on the cartesian plane: translation, reflection, rotation, enlargement (dilation). Description of a translation using column vectors. **Transformations and vectors C5.6**	Transformations on the cartesian plane: translation, reflection, rotation, enlargement (dilation), stretch. Description of a translation using column vectors. **Transformations and vectors E5.6**	Unit 5 – Transformations and Vectors (Core) Unit 5 – Transformations and Vectors (Extended)

Common Core State Standards - Congruence		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Experiment with transformations in the plane				
G-CO3	3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	Line and rotational symmetry in 2D. **Geometry C4.3** Transformations on the cartesian plane: translation, reflection, rotation, enlargement (dilation). Description of a translation using column vectors. **Transformations and vectors C5.6**	Line and rotational symmetry in 2D and 3D. **Geometry E4.3** Transformations on the cartesian plane: translation, reflection, rotation, enlargement (dilation), stretch. Description of a translation using column vectors. **Transformations and vectors E5.6**	Unit 4 – Geometry (Core) Unit 4 – Geometry (Extended) Unit 5 – Transformations and Vectors (Core) Unit 5 – Transformations and Vectors (Extended)
G-CO4	4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	Transformations on the cartesian plane: translation, reflection, rotation, enlargement (dilation). Description of a translation using column vectors. **Transformations and vectors C5.6**	Transformations on the cartesian plane: translation, reflection, rotation, enlargement (dilation), stretch. Description of a translation using column vectors. **Transformations and vectors E5.6**	Unit 5 – Transformations and Vectors (Core) Unit 5 – Transformations and Vectors (Extended)

Common Core State Standards - Congruence		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Experiment with transformations in the plane				
G-CO5	5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	Transformations on the cartesian plane: translation, reflection, rotation, enlargement (dilation). Description of a translation using column vectors. **Transformations and vectors C5.6**	Transformations on the cartesian plane: translation, reflection, rotation, enlargement (dilation), stretch. Description of a translation using column vectors. **Transformations and vectors E5.6** Inverse of a transformation. **Transformations and vectors E5.7** Combined transformations. **Transformations and vectors E5.8**	Unit 5 – Transformations and Vectors (Core) Unit 5 – Transformations and Vectors (Extended)
Understand congruence in terms of rigid motions				
G-CO6	6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.		Congruence. Use the definition of congruence to show that two triangles are congruent if, and only if, corresponding pairs of sides and corresponding pairs of angles are congruent. **Geometry E4.8**	Unit 4 – Geometry (Extended)

Common Core State Standards - Congruence		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Understand congruence in terms of rigid motions				
G-CO7	7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.		Congruence. Use the definition of congruence to show that two triangles are congruent if, and only if, corresponding pairs of sides and corresponding pairs of angles are congruent. **Geometry E4.8**	Unit 4 – Geometry (Extended)
G-CO8	8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.		Congruence. Use the definition of congruence to show that two triangles are congruent if, and only if, corresponding pairs of sides and corresponding pairs of angles are congruent. **Geometry E4.8**	Unit 4 – Geometry (Extended)

Common Core State Standards - Congruence		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Prove geometric theorems				
G-CO9	9. Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.	Angles round a point. Angles on a straight line and intersecting straight lines. Vertically opposite angles. Alternate and corresponding angles on parallel lines. Angle properties of triangles, quadrilaterals, and polygons, Interior and exterior angles of a polygon. **Geometry C4.4 (proof not expected)**	Angles round a point. Angles on a straight line and intersecting straight lines. Vertically opposite angles. Alternate and corresponding angles on parallel lines. Angle properties of triangles, quadrilaterals, and polygons. Interior and exterior angles of a polygon. **Geometry E4.4 (proof not expected)**	Unit 4 – Geometry (Core) Unit 4 – Geometry (Extended)
G-CO10	10. Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.	Angles round a point. Angles on a straight line and intersecting straight lines. Vertically opposite angles. Alternate and corresponding angles on parallel lines. Angle properties of triangles, quadrilaterals, and polygons, Interior and exterior angles of a polygon. **Geometry C4.4 (proof not expected)**	Angles round a point. Angles on a straight line and intersecting straight lines. Vertically opposite angles. Alternate and corresponding angles on parallel lines. Angle properties of triangles, quadrilaterals, and polygons. Interior and exterior angles of a polygon. **Geometry E4.4 (proof not expected)**	Unit 4 – Geometry (Core) Unit 4 – Geometry (Extended)

Common Core State Standards - Congruence		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Prove geometric theorems				
G-CO11	11. Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.			These properties may be tested when solving, for example, problems on angles and parallel lines but the **proof of the properties** will not be tested but may be taught during the topic.

Common Core State Standards - Congruence		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Make geometric constructions				
G-CO12	12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	Construction. Make formal geometric constructions with compass and straight edge only. Copy a segment; copy an angle; bisect a segment; bisect an angle; construct perpendicular lines, including the perpendicular bisector of a line segment. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. Construct the inscribed and circumscribed circles of a triangle. Construct a tangent line from a point outside a given circle to the circle. Angle measurement in degrees. Read and make scale drawings. **Geometry C4.5**	Construction. Make formal geometric constructions with compass and straight edge only. Copy a segment; copy an angle; bisect a segment; bisect an angle; construct perpendicular lines, including the perpendicular bisector of a line segment. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. Construct the inscribed and circumscribed circles of a triangle. Construct a tangent line from a point outside a given circle to the circle. Angle measurement in degrees. Read and make scale drawings. **Geometry E4.5**	Unit 4 – Geometry (Core) Unit 4 – Geometry (Extended)

Common Core State Standards - Congruence		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Make geometric constructions				
G-CO13	13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	Construction. Make formal geometric constructions with compass and straight edge only. Copy a segment; copy an angle; bisect a segment; bisect an angle; construct perpendicular lines, including the perpendicular bisector of a line segment. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. Construct the inscribed and circumscribed circles of a triangle. Construct a tangent line from a point outside a given circle to the circle. Angle measurement in degrees. Read and make scale drawings. **Geometry C4.5**	Construction. Make formal geometric constructions with compass and straight edge only. Copy a segment; copy an angle; bisect a segment; bisect an angle; construct perpendicular lines, including the perpendicular bisector of a line segment. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. Construct the inscribed and circumscribed circles of a triangle. Construct a tangent line from a point outside a given circle to the circle. Angle measurement in degrees. Read and make scale drawings. **Geometry E4.5**	Unit 4 – Geometry (Core) Unit 4 – Geometry (Extended)

Common Core State Standards - Similarity, Right Triangles, and Trigonometry		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Understand similarity in terms of similarity transformations				
G-SRT1	1. Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	Transformations on the cartesian plane: translation, reflection, rotation, enlargement (dilation). Description of a translation using column vectors. **Transformations and vectors C5.6**	Transformations on the cartesian plane: translation, reflection, rotation, enlargement (dilation), stretch. Description of a translation using column vectors. **Transformations and vectors E5.6**	Unit 5 – Transformations and Vectors (Core) Unit 5 – Transformations and Vectors (Extended)
G-SRT2	2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	Transformations on the cartesian plane: translation, reflection, rotation, enlargement (dilation). Description of a translation using column vectors. **Transformations and vectors C5.6** Similarity. Calculation of lengths of similar figures. **Geometry C4.7**	Transformations on the cartesian plane: translation, reflection, rotation, enlargement (dilation), stretch. Description of a translation using column vectors. **Transformations and vectors E5.6** Similarity. Calculation of lengths of similar figures. Area and volume scale factors. **Geometry E4.7**	Unit 5 – Transformations and Vectors (Core) Unit 5 – Transformations and Vectors (Extended) Unit 4 – Geometry (Core) Unit 4 – Geometry (Extended)
G-SRT3	3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	Similarity. Calculation of lengths of similar figures. **Geometry C4.7**	Similarity. Calculation of lengths of similar figures. Area and volume scale factors. **Geometry E4.7**	Unit 4 – Geometry (Core) Unit 4 – Geometry (Extended)

Common Core State Standards - Similarity, Right Triangles, and Trigonometry		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Prove theorems involving similarity				
G-SRT4	4. Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.	*The proof will not be tested, but knowledge of the properties is expected.*		These properties may be tested when solving, for example, problems on similarity and congruency but the **proof of the properties** will not be tested but may be taught.
G-SRT5	5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.		Congruence. Use the definition of congruence to show that two triangles are congruent if, and only if, corresponding pairs of sides and corresponding pairs of angles are congruent. **Geometry E4.8** Similarity. Calculation of lengths of similar figures. Area and volume scale factors. **Geometry E4.7**	Unit 4 – Geometry (Extended)

Common Core State Standards - Similarity, Right Triangles, and Trigonometry		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Define trigonometric ratios and solve problems involving right triangles				
G-SRT6	6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	Use trigonometric ratios and the Pythagorean Theorem to solve right-angled triangles in applied problems. **Trigonometry C8.1**	Use trigonometric ratios and the Pythagorean Theorem to solve right-angled triangles in applied problems. Know the exact values for the trigonometric ratios of 0°, 30°, 45°, 60°, 90°. **Trigonometry E8.1**	Unit 8 – Trigonometry (Core) Unit 8 – Trigonometry (Extended)
G-SRT7	7. Explain and use the relationship between the sine and cosine of complementary angles.		Extend sine and cosine values to angles between 0° and 360°. Explain and use the relationship between the sine and cosine of complementary angles. Graph and know the properties of trigonometric functions **Trigonometry E8.2**	Unit 8 – Trigonometry (Extended)
G-SRT8	8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	Use trigonometric ratios and the Pythagorean Theorem to solve right-angled triangles in applied problems. **Trigonometry C8.1**	Use trigonometric ratios and the Pythagorean Theorem to solve right-angled triangles in applied problems. Know the exact values for the trigonometric ratios of 0°, 30°, 45°, 60°, 90°. **Trigonometry E8.1**	Unit 8 – Trigonometry (Core) Unit 8 – Trigonometry (Extended)

Common Core State Standards - Similarity, Right Triangles, and Trigonometry		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Apply trigonometry to general triangles				
G-SRT9	9. (+) Derive the formula $A = 1/2\ ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.		Area of triangle. Derivation of the formula will not be tested.**Trigonometry E8.5**	Derivation of the formula will not be tested but can be introduced in the teaching of the topic. Unit 8 - Trigonometry Extended
G-SRT10	10. (+) Prove the Laws of Sines and Cosines and use them to solve problems.	*The proof will not be tested directly, but the use of rules in application to solve problems is expected.*		Will not be tested but may be taught when introducing the topic.
G-SRT11	11. (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).		Sine Rule. **Trigonometry E8.3** Cosine Rule. **Trigonometry E8.4**	Unit 8 – Trigonometry (Extended)

Common Core State Standards - Circles		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Understand and apply theorems about circles				
G-C1	1. Prove that all circles are similar.	*This will not be tested.*		Will not be tested - could be a used as a discussion point during the simlarity topic.
G-C2	2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.	Vocabulary of circles. Properties of circles: • tangent perpendicular to radius at the point of contact • angle in a semicircle. **Geometry C4.6**	Vocabulary of circles. Properties of circles: • tangent perpendicular to radius at the point of contact • tangents from a point • angle in a semicircle • angles at the center and at the circumference on the same arc • cyclic quadrilateral Use the following symmetry properties of a circle: • equal chords are equidistant from the center • the perpendicular bisector of a chord passes through the center • tangents from an external point are equal in length. **Geometry E4.6**	Unit 4 – Geometry (Core) Unit 4 – Geometry (Extended)

Common Core State Standards - Circles		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Understand and apply theorems about circles				
G-C3	3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	Construction. Make formal geometric constructions with compass and straight edge only. Copy a segment; copy an angle; bisect a segment; bisect an angle; construct perpendicular lines, including the perpendicular bisector of a line segment. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. Construct the inscribed and circumscribed circles of a triangle. Construct a tangent line from a point outside a given circle to the circle. Angle measurement in degrees. Read and make scale drawings. **Geometry C4.5**	Construction. Make formal geometric constructions with compass and straight edge only. Copy a segment; copy an angle; bisect a segment; bisect an angle; construct perpendicular lines, including the perpendicular bisector of a line segment. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. Construct the inscribed and circumscribed circles of a triangle. Construct a tangent line from a point outside a given circle to the circle. Angle measurement in degrees. Read and make scale drawings. **Geometry E4.5**	Unit 4 – Geometry (Core) Unit 4 – Geometry (Extended)

Common Core State Standards - Circles		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Understand and apply theorems about circles				
G-C4	4. (+) Construct a tangent line from a point outside a given circle to the circle.	Construction. Make formal geometric constructions with compass and straight edge only. Copy a segment; copy an angle; bisect a segment; bisect an angle; construct perpendicular lines, including the perpendicular bisector of a line segment. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. Construct the inscribed and circumscribed circles of a triangle. Construct a tangent line from a point outside a given circle to the circle. Angle measurement in degrees. Read and make scale drawings. **Geometry C4.5**	Construction. Make formal geometric constructions with compass and straight edge only. Copy a segment; copy an angle; bisect a segment; bisect an angle; construct perpendicular lines, including the perpendicular bisector of a line segment. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. Construct the inscribed and circumscribed circles of a triangle. Construct a tangent line from a point outside a given circle to the circle. Angle measurement in degrees. Read and make scale drawings. **Geometry E4.5**	Unit 4 – Geometry (Core) Unit 4 – Geometry (Extended)

Common Core State Standards - Circles		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Find arc lengths and areas of sectors of circles				
G-C5	5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	Circumference and area of a circle. Arc length and area of sector. Work in degrees only. **Mensuration C6.3**	Circumference and area of a circle. Arc length and area of sector. Work in degrees only. **Mensuration E6.3**	Unit 6 – Mensuration (Core) Unit 6 – Mensuration (Extended)

Common Core State Standards - Circles		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Translate between the geometric description and the equation for a conic section				
G-GPE1	1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	*These standards are covered in the Additional Mathematics (US) syllabus.*		
G-GPE2	2. Derive the equation of a parabola given a focus and directrix.			
G-GPE3	3. (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.			
Use coordinates to prove simple geometric theorems algebraically				
G-GPE4	4. Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).		Use co-ordinates to compute the perimeters of polygons and areas of triangles using the distance formula. **Coordinated geometry C7.2**	Unit 7 – Coordinate geometry (Extended)
G-GPE5	5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	Slope of parallel line. Find the equation of a line parallel to a given line that passes through a given point. **Coordinate geometry C7.6**	Slope of parallel line. Find the equation of a line parallel to a given line that passes through a given point. Slope of perpendicular line. Find the equation of a line perpendicular to a given line that passes through a given point. **Coordinate geometry E7.6**	Unit 7 – Coordinate geometry (Core) Unit 7 – Coordinate geometry (Extended)

Common Core State Standards - Circles		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Use coordinates to prove simple geometric theorems algebraically				
G-GPE6	6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	Midpoint of a line segment. **Coordinate geometry C7.3**	Midpoint of a line segment. Find the point on a directed line segment between two given points that partitions the segment in a given ratio. **Coordinate geometry E7.3**	Unit 7 – Coordinate geometry (Core) Unit 7 – Coordinate geometry (Extended)
G-GPE7	7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	Distance between two points. **Coordinate geometry C7.2**	Distance between two points. **Coordinate geometry E7.2**	Unit 7 – Coordinate geometry (Core) Unit 7 – Coordinate geometry (Extended)

Common Core State Standards - Geometric Measurement and Dimension		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Explain volume formulas and use them to solve problems				
G-GMD1	1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.	*Informal arguments for the formulas for area and circumference of circles, volumes of cylinders, pyramids and cones will not be tested. Cavalieri's principle will not be tested.*		Derivation of the formulae will not be tested and appropriate formulae are provided on the formula page (see syllabus appendices). The arguments for the formulae may be introduced however in teaching or through and investigation for students.
G-GMD2	2. (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.			Derivation of the formulae will not be tested and appropriate formulae are provided on the formula page (see syllabus appendices). The arguments for the formulae may be introduced however in teaching or through an investigation for students.

Common Core State Standards - Geometric Measurement and Dimension		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Explain volume formulas and use them to solve problems				
G-GMD3	3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	Surface area and volume of prism (in particular, cuboid and cylinder). Surface area and volume of sphere. **Mensuration C6.4**	Surface area and volume of prism and pyramid (in particular cuboid, cylinder, and cone). Surface area and volume of sphere. **Mensuration E6.4** Areas and volumes of compound shapes. **Mensuration E6.5**	Unit 6 - Mensuration (Core) Unit 6 - Mensuration (Extended)
Visualize relationships between two-dimensional and three-dimensional objects				
G-GMD4	4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	*Students will not be tested on their ability to identify two-dimensional cross-sections of three-dimensional objects.*		Will not be tested but could be used as an investigation of solids and their properties in the transformations or mensuration section of the Scheme of Work.

Common Core State Standards - Modeling with Geometry		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Apply geometric concepts in modeling situations				
G-MG1	1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).	Use geometric shapes, their measures, and their properties to describe objects. **Mensuration C6.6**	Use geometric shapes, their measures, and their properties to describe objects. **Mensuration E6.6**	Unit 6 - Mensuration (Core) Unit 6 - Mensuration (Extended)
G-MG2	2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).	*Applying the concepts of density in modelling problems will not be tested.*		Will not be tested but may be taught when introducing the topic.
G-MG3	3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).	*Applying geometric methods to solve design problems will not be tested.*		Will not be tested but may be taught when introducing the topic.

Mathematics: High School–Statistics and Probability

Common Core State Standards - Interpreting Categorical and Quantitative Data		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Summarize, represent, and interpret data on a single count or measurement variable				
S-ID1	1. Represent data with plots on the real number line (dot plots, histograms, and box plots).	Compound bar chart, dot plots, line graph, pie chart, simple frequency distributions, scatter diagram. **Statistics C10.3**	Compound bar chart, dot plots, line graph, pie chart, simple frequency distributions, scatter diagram. **Statistics E10.3** Cumulative frequency table and curve and box plots. Median, quartiles, percentiles, and inter-quartile range. **Statistics E10.6 Histograms E10.5**	Unit 10 – Statistics (Core) Unit 10 – Statistics (Extended)
S-ID2	2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.		Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range) of two or more different data sets. **Statistics E10.7**	Unit 10 – Statistics (Extended)
S-ID3	3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).		Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range) of two or more different data sets. **Statistics E10.7**	Unit 10 – Statistics (Extended)

Mathematics: High School–Statistics and Probability

Common Core State Standards - Interpreting Categorical and Quantitative Data		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Summarize, represent, and interpret data on two categorical and quantitative variables				
S-ID4	4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	*This standard is covered by the Additional Mathematics (US) syllabus and the AS Mathematics (US) syllabus.*		
S-ID5	5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	*This standard is covered by the Additional Mathematics (US) syllabus.*		
S-ID6	6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.	Understanding and description of correlation (positive, negative, or zero) with reference to a scatter diagram. Straight line of best fit (by eye) through the mean on a scatter diagram. **Statistics C10.8**	Understanding and description of correlation (positive, negative, or zero) with reference to a scatter diagram. Straight line of best fit (by eye) through the mean on a scatter diagram. **Statistics E10.8**	Unit 10 – Statistics (Core) Unit 10 – Statistics (Extended)
Interpret linear models				
S-ID7	7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	*These standards are covered by the AS Mathematics (US) syllabus.*		
S-ID8	8. Compute (using technology) and interpret the correlation coefficient of a linear fit.			

Common Core State Standards - Interpreting Categorical and Quantitative Data		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Summarize, represent, and interpret data on two categorical and quantitative variables				
S-ID9	9. Distinguish between correlation and causation.	*This standard is covered by the AS Mathematics (US) syllabus.*		

Common Core State Standards - Making Inferences and Justifying Conclusions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Understand and evaluate random processes underlying statistical experiments				
S-IC1	1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	*This standard is covered by the Additional Mathematics (US) syllabus.*		
S-IC2	2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?	Relative frequency as an estimate of probability. **Probability C9.2** Expected number of occurences. **Probability C9.3**	Relative frequency as an estimate of probability. **Probability E9.2** Expected number of occurences. **Probability E9.3**	Unit 9 – Probability (Core) Unit 9 – Probability (Extended)
Make inferences and justify conclusions from sample surveys, experiments, and observational studies				
S-IC3	3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	*These standards are covered by the Additional Mathematics (US) syllabus.*		
S-IC4	4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.			
S-IC5	5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.			
S-IC6	6. Evaluate reports based on data.	*This will not be tested.*		Will not be tested but may be taught when introducing the topic.

Common Core State Standards - Conditional Probability and the Rules of Probability		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Understand independence and conditional probability and use them to interpret data				
S-CP1	1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").	Probability P(A) as a fraction, decimal, or percentage. Significance of its value, including using probabilities to make fair decisions. **Probability C9.1**	Probability P(A) as a fraction, decimal, or percentage. Significance of its value, including using probabilities to make fair decisions. **Probability E9.1**	Unit 9 – Probability (Core) Unit 9 – Probability (Extended)
S-CP2	2. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	Possibility diagrams. Tree diagrams including successive selection with or without replacement. **Probability C9.5**	Combining events: the addition rule P(A or B) = P(A) + P(B) – P(A and B) the multiplication rule P(A and B) = P(A) × P(B). **Probability E9.4** Possibility diagrams. Tree diagrams including successive selection with or without replacement. **Probability E9.5**	Unit 9 – Probability (Core) Unit 9 – Probability (Extended)
S-CP3	3. Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.	*This standard is covered by the Additional Mathematics (US) syllabus and the AS Mathematics (US) syllabus.*		

Common Core State Standards - Conditional Probability and the Rules of Probability		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Understand independence and conditional probability and use them to interpret data				
S-CP4	4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.	*These standards are covered by the Additional Mathematics (US) syllabus.*		
S-CP5	5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.			
Use the rules of probability to compute probabilities of compound events in a uniform probability model				
S-CP6	6. Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.	*These standards are covered by the Additional Mathematics (US) syllabus.*		
S-CP7	7. Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.		Combining events: the addition rule P(A or B) = P(A) + P(B) – P(A and B) the multiplication rule P(A and B) = P(A) x P(B). **Probability E9.4** Possibility diagrams. Tree diagrams including successive selection with or without replacement. **Probability E9.5**	Unit 9 – Probability (Extended)

Common Core State Standards - Conditional Probability and the Rules of Probability		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Use the rules of probability to compute probabilities of compound events in a uniform probability model				
S-CP8	8. (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.		Combining events: The addition rule P(A or B) = P(A) + P(A and B) The multiplication rule P(A and B) = P(A) x P(B) **Probability E9.4**	Unit 9 – Probability (Extended)
S-CP9	9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems.	*This standard is covered in the AS Mathematics (US) syllabus.*		

Common Core State Standards - Using Probability to Make Decisions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Calculate expected values and use them to solve problems				
S-MD1	1. (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.	*These standards are covered by the Additional Mathematics (US) syllabus and the AS Mathematics (US) syllabus.*		
S-MD2	2. (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.			
S-MD3	3. (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.			
S-MD4	4. (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?			

Common Core State Standards - Using Probability to Make Decisions		Core curriculum content (0444)	Extended curriculum content (0444)	Scheme of Work
Use probability to evaluate outcomes of decisions				
S-MD5	5. (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. a. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant. b. Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.	*These standards are covered by the Additional Mathematics (US) syllabus.*		
S-MD6	6. (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).	Probability P(A) as a fraction, decimal or percentage. Significance of value, including probabilities to make fair decisions. **Probability C9.1**	Probability P(A) as a fraction, decimal or percentage. Significance of value, including probabilities to make fair decisions. **Probability E9.1**	Unit 9 – Probability (Core) Unit 9 – Probability (Extended)
S-MD7	7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).	*These standards are covered by the Additional Mathematics (US) syllabus and the AS Mathematics (US) syllabus.*		