

Algebra	Geometry	Algebra 2	Pre-Calculus/IB
<b>NUMBER</b>			
<b>Number Systems</b>			
<p>Function notation. Use of a variety of function notations (e.g. mapping, "<math>f(x) = </math>", "<math>y = </math>", etc.).</p> <p>Use the correct order of arithmetic operations (Distributive Law)</p> <p>Calculate using absolute value.</p> <p>Correctly perform addition, subtraction, multiplication and division that includes variables</p>	<p>Function notation. Use of a variety of function notations (e.g. mapping, "<math>f(x) = </math>", "<math>y = </math>", etc.).</p>	<p>Mapping diagrams and notation. Function notation.</p> <p>Use of a variety of function notations (e.g. mapping, "<math>f(x) = </math>", "<math>y = </math>", etc.).</p>	<p>Mapping diagrams and notation. Function notation.</p> <p>Use of a variety of function notations (e.g. mapping, "<math>f(x) = </math>", "<math>y = </math>", etc.).</p> <p>Understand relative magnitude</p> <p>Perform appropriate basic operations on sets (e.g., union, intersection, elements of, subsets and complement)</p>
<b>Linear</b>			
<p>Domain and range.</p> <p>Gradient.</p> <p>Linear equations. Graphs.</p> <p>Applications. Solve linear equations and absolute value equations Solve systems of linear equations and inequalities using algebraic and graphical methods</p>	<p>Domain and range.</p> <p>Various forms of Linear equations.</p> <p>Coordinate plane. Solutions of systems of linear equations algebraically and graphically.</p>	<p>Solutions of systems of linear equations using the GDC.</p>	<p>Review writing linear equations.</p>

<b>Quadratic</b>			
<p>Domain and range.</p> <p>Graphs of quadratic functions. Quadratic functions in the form <math>y=a(x+h)^2+k</math> Solutions of quadratic equations by factoring and the quadratic formula (use of the GDC is also encouraged).</p>		<p>Domain and range.</p> <p>Graphs of quadratic functions. Quadratic functions in the form <math>y=a(x+h)^2+k</math> Solutions of quadratic equations by factoring and the quadratic formula (use of the GDC is also encouraged).</p>	<p>Continual reference throughout the course where appropriate.</p>
<b>Exponential and Logarithmic</b>			
<p>Factor polynomials</p>	<p>Domain and range.</p> <p>Graphs of exponential functions.</p> <p>Relationship between exponential and logarithmic functions.</p> <p>Equations of asymptotes.</p> <p>Know the definitions of sine, cosine and tangent using right triangle geometry and similarity relations</p>	<p>Graph exponential and logarithmic equations.</p> <p>Equations of asymptotes.</p>	<p>Continual reference throughout the course where appropriate.</p>
<b>Circular</b>			
		<p>Domain and range.</p> <p>Graphs of sine, cosine and tangent curves (in degrees and radians).</p> <p>Applications.</p>	<p>Continual reference throughout the course where appropriate.</p>

<b>Rational/reciprocal</b>			
		Domain and range. Graphs of rational functions with and without a GDC. Equations of asymptotes. Use of a GDC to graph unfamiliar functions.	Domain and range. Graphs of rational functions with and without a GDC. Equations of asymptotes. Use of a GDC to graph unfamiliar functions.
<b>Transformations</b>			
Rigid transformations (horizontal shift).	Transformations of quadratic functions  Effects of parameters $a$ , $h$ and $k$ on the graph of $f(x) = a(x-h)^2 + k$ .	Transformations as applied to functions.	Continual reference throughout the course where appropriate.
<b>Composite</b>			
	Find composite functions in the form $f(g(x))$ and $(fog)x$ .	Find composite functions in the form $f(g(x))$ and $(fog)x$ .	Continual reference throughout the course where appropriate.
<b>Inverse</b>			
	Find and graph the inverse of quadratic and linear functions.	Find and graph the inverse of functions.	Find and graph the inverse of functions.

**ALGEBRA****Sequences and series**

Connection of linear functions with arithmetic sequences such as simple interest.	Arithmetic and geometric sequences and series, links to linear and exponential functions such as simple interest, currency conversion, and compound interest.	Arithmetic and geometric sequences and series.  Sum of finite series, apply to value of investments. Sum of infinite geometric series.  Sigma notation.	Arithmetic and geometric sequences and series.  Sum of finite series, apply to value of investments. Sum of infinite geometric series.  Sigma notation.
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**Exponents and logarithms**

	Laws of exponents.	Continual reference throughout the course where appropriate (e.g sequences and series).	Continual reference throughout the course where appropriate (e.g sequences and series).
	Laws of logarithms. Exponential growth and decay. Applications.		

**Binomial theorem**

		Expansion of polynomials of degree 2 and 3. Introduction to Pascal's triangle.	Expansion of polynomials of degree 2 and 3. Introduction to Pascal's triangle.
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**GEOMETRY****Coordinate Geometry**

Coordinate plane.	Coordinate plane.	Continual reference throughout the course where appropriate.	
Distance formula.	Distance formula.		
Midpoint formula.	Midpoint formula.		
Parallel and perpendicular lines.	Parallel and perpendicular lines.		

**Shapes**

Area, surface area and volume .	Continual reference throughout the course where appropriate.	Continual reference throughout the course where appropriate.	Continual reference throughout the course where appropriate.
Terminology such as trapezium and cuboid.			

<b>TRIGNOMETRY</b>			
<b>Arcs and angles</b>			
	3-figure bearing and compass directions.	Radian measure. Arc length. Area of sector.	
<b>Solving Triangles</b>			
Right triangles, formulas for the area of a triangle. SOHCAHTOA. Pythagoras' theorem.		Right-angled trigonometry. Sine rule (including the ambiguous case). Cosine rule. Area of a triangle.	Continual reference throughout the course where appropriate.
<b>Identities</b>			
			Tangent (include application to gradient), Pythagorean and double-angle identity.
<b>Equations</b>			
Solutions of equations for angles in the first quadrant.			Solutions over a finite interval. Use of identities to solve equations.
<b>MATRICES</b>			
<b>Matrix operations</b>			
		Algebraic operations with matrices (with and without a GDC). Algebraic operations with vectors written as a column matrix.	Continual reference throughout the course where appropriate.
<b>Determinants</b>			
		Determinants of 2x2 and 3x3 matrices should be calculated with and without a GDC. Inverses of matrices: 2x2 without a GDC, 3x3 and higher with a GDC.	Continual reference throughout the course where appropriate.

<b>Systems of equations</b>			
Solutions of systems of equations graphically and algebraically.		Solutions of systems of equations graphically and algebraically.  Solutions of systems of equations using inverse matrices.	Continual reference throughout the course where appropriate.
<b>VECTORS</b>			
<b>Vector Operations</b>			
			Addition, subtraction, multiplication by a scalar, scalar product of two and three-dimensional vectors.
<b>Applications</b>			
Parallel, perpendicular and skew lines.		Angle between two vectors.  Applications to motion of objects in two and three dimensions (including non-parallel lines which do not intersect)  Representation of a line using vector notation.	Continual reference throughout the course where appropriate.

<b>STATISTICS AND PROBABILITY</b>			
<b>Terminology</b>			
Discrete, continuous, random sample, population.	Discrete, continuous, random sample, population.	Discrete, continuous, random sample, population.	Discrete, continuous, random sample, population.
<b>Statistics and representations</b>			
Frequency tables and graphs, stem and leaf diagrams and box and whisker plots.	Frequency tables and graphs, stem and leaf diagrams and box and whisker plots.	Frequency tables and graphs, stem and leaf diagrams and box and whisker plots.	Frequency tables and graphs (including grouped and non-grouped data). Cumulative frequency tables and graphs. Use of cumulative frequency graphs to estimate percentiles. Discrete and continuous data. Box and whisker plots.
<b>Statistical measures</b>			
Mean, median and mode. Standard deviation.	Mean, median and mode. Standard deviation.	Mean, median and mode. Standard deviation.	Measures of central tendency and dispersion.
<b>Statistical distributions</b>			
Introduction of the normal distribution curve and that approximately 68% of the data lies within one standard deviation of the mean.	Introduction of the normal distribution curve and that approximately 68% of the data lies within one standard deviation of the mean.	Introduction of the normal distribution curve and that approximately 68% of the data lies within one standard deviation of the mean.	Normal distribution and applications. Binomial distribution and applications. Expected value.
<b>Probability of events</b>			
Definition of probability. Laws of probability (conjunction, disjunction, complement).	Definition of probability. Laws of probability (conjunction, disjunction, complement).	Definition of probability. Laws of probability (conjunction, disjunction, complement).	Definition of probability. Laws of probability (conjunction, disjunction, complement).
<b>Probability diagrams</b>			
Tree diagrams and charts.	Tree diagrams and charts.	Venn diagrams, tree diagrams, charts.	Venn diagrams, tree diagrams, charts.

**CALCULUS****Differential**

Informal ideas of limits and convergence.  
Definition of the derivative.  
Familiarity with various forms of notation.  
Derivatives of exponential, logarithmic and trigonometric functions.  
The definition of derivative, Power rule, Product rule, Quotient rule and Chain rule.  
Equations of tangent lines.  
Behavior of a function (increasing, decreasing and stationary).  
  
Application to maximum/minimum points, curve sketching, kinematics.

**Integral**

Definite and indefinite.  
Applications to the area between curves and volumes of a solid of revolution.