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Analysis and Approaches Topic Checklist

Standard and Higher <mark>Higher only</mark>

IB-A&A		00	200
Number and A	lgebra		
Standard Form			
Arithmetic Series			
Geometric series (including sum of infinite geometric series)			
Sigma Notation Series applications (simple Interest, compound Interest, population growth/spread of disease)			
Indices rules – multiplication, division, negative powers and rational powers			
Solving logs and exponential equations (including hidden quadratics with exponentials)			
Logs – 5 rules (index, power, multiplication, division, change of base)			
Algebraic proofs Binomial expansion – integer powers			
Counting principles, permutations and combinations			
Binomial expansion – fractional and negative powers			
Partial fractions			
Complex numbers Proof by induction			
Proof by counterexample			
Proof by contradiction			
Solutions of systems of linear equations (max of 3 unknowns including unique, infinite or no solution)			
Function	S		
3 forms of a straight line			
Gradients and intercepts Midpoint and distances			
Straight Line Graphs – finding equations			
Parallel lines			
Perpendicular lines Functions – basic calculations including composite and types of functions (one to one, many to one)			
Domain and range			
Functions – inverse (calculating and using the fact that domain of inverse is range and range is domain,			
knowing when an inverse exists)			
Using a calculator to sketch and locate key features of graphs of functions (max, min, zeros, intercepts, vertex, asymptotes, intersection of 2 curves)			
Quadratics – graph, intercepts, axis of symmetry, vertex			
Quadratics – converting between 3 forms (factorised, vertex and standard)			
Quadratics – given graph form equation and vice versa Quadratics – solving including the quadratic formula (including hidden quadratics)			
Quadratics – discriminant			
Quadratics – solving inequalities			
Reciprocal function $\frac{1}{r}$ and it's graph			
Rational functions $f(x) = \frac{ax+b}{cx+d}$ and their graphs (including equations of vertical and horizontal asymptotes)			
Exponential and logarithmic graphs			
Solving graphically e.g. $e^x = \sin x$, $x^4 + 5x - 6 = 0$ Transformations: $f(x) \rightarrow af(bx + c) + d$		-	
Polynomial functions – graphs and zeros			
Factor and remainder theorem			
Polynomial division			
Sum and products of roots of polynomial equations Rational functions $f(x) = \frac{ax+b}{cx^{2+4}ax+e}$ or $f(x) = \frac{ax^{2}+bx+c}{dx+e}$ and their graphs (including equations of vertical,			
horizontal and slant asymptotes) $f(x) = \frac{1}{dx+e}$ and their graphs (including equations of vertical,			
Odd and even functions			
Periodic functions			
Solutions of inequalities both graphically and analytically e.g. solve $g(x) \ge f(x)$ Graphs of transformations (modulus, reciprocal, translations, sums/differences, squares, inverse). For			
example, given the graph of $f(x)$ and then need to graph any of $ f(x) , f(x), \frac{1}{f(x)'}$			
$f(ax + b), [f(x)]^2, f^{-1}(x)$			
Solutions and modulus and inequalities			
Geometry and Trig	onometry		
The distance between two points in three- dimensional space, and their midpoint.			
Volume and surface area of 3D shapes – Pyramid, cone, sphere, hemisphere and combinations of these			
Size of an angle between two intersecting lines or between a line and a place			
Sine, cosine, and tangent ratios using special triangles (SOHCAHTOA)			
Sine/cosine Rule (including ambiguous case of sine rule)			
Area of a triangle			
Bearings Angles of elevation and depression			
Radians			
Arc lengths and areas of sectors			
0			

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Finding tig values of multiple angles of page call angles using the unit circle Exact values of trigonometric ratios of $\frac{1}{2} = \frac{1}{2} = \frac{1}{2}$ and their multiples. Given the value of one trig functions, find another (relationship between ratios) Identities sin ² x + cos ² x = 1 and tan x = $\frac{mx}{cosx}$ Double angle identity sin 2 z = 2 sin x cos x cos 2 z = cos ² x - sin ² x Transformations of trig functions and their graphs Trig Modeling -Real life contexts such as height of a tide and motion of a ferris wheel. Also including given graph find equation and vice versa (involves finding period, amplitude, phase shift). Solving trig equations (including quadratics) Identities 1 + tan ² x = sec ² and 1 + cos ² x = cose ² x Double angle identity tan 2 x = $\frac{2\pi ans}{2\pi ans}$ Compound angle identity and A B = sin Acos B ± cos A sin B , cos(A ± B) = cosAcos B ± sin Asis B trig (Model) = nife functions (co-functions) sin (180 ^o = 0) = sin Ø Relationship between trig functions and bipe sin x into rsin ($\theta \pm a$) or rcos($\theta \pm a$) b forms Interse Tig Relationship with vectors, zons and a bipe sin x into rsin ($\theta \pm a$) or rcos ($\theta \pm a$) b forms Interset of 0 = sin Ø Controp of a line of 0 = sin Ø Cot (100 ^o - 0) = - cos Ø trig (100 ^o - 0) = - cos Ø	
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Interpretation of outliers	
Presentation of data (discrete and continuous) – lists and grouped/ungrouped frequency distributions	
(tables).	
Histograms Control Con	
Cumulative frequency; cumulative frequency graphs; use to find median, quartiles, percentiles, range	
and interquartile range (IQR).	
Box and whisker	
Measures of central tendency (mean, median and mode).	
Estimation of mean from grouped data	
Modal class	
Measures of dispersion (interquartile range, standard deviation and variance)	
Effect of constant changes on the original data.	
Quartiles of discrete data	
Scatter diagrams; lines of best fit, by eye, passing through the mean point.	
Linear correlation of bivariate data (Pearson's product-moment correlation coefficient and line of best	
fit)	
Find and use of the equation of the regression line for prediction purposes (reliability)	
Interpret the meaning of the parameters, a and b , in a linear regression $y = ax + b$	
Sample Space	
Venn diagram	
Tree diagram	
Two-way tables	
Addition formula	
Mutually exclusive events	
Independent events de la	
Conditional probability Conditional probability	
Concept of discrete random variables and their probability distributions. Expected value (mean), for	
discrete data. Applications such as fair game	
Binomial distribution (including mean and variance)	
Normal distribution (probability calculations and working backwards to find the value, mean or sd.	
Bayes Theorem and the second	
Variance of a discrete random variable	
Continuous random variables and their probability density functions	
Mode and median of continuous random variables	
Mean, variance and standard deviation of both discrete and continuous random variables	
The effect of linear transformations of X	
Calculus	
Concept of a limit	
Concept of a limit	
Derivative interpreted as gradient function and as rate of change	
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Stationary/Turning points (max/min)		
Second derivative and using this to test for max/min		
Optimisation		
Convex/Concave		
Points of Inflection		
$f \leftrightarrow f' \leftrightarrow f''$ graphs		
Optimisation (profit, area, volume)		
Kinematics		
$\int x^n$ Integration technique		
Definite integrals		
Finding area under a curve and between two curves		
Composite functions integration techniques ($(f(x))^n$, $lnf(x)$, $e^{f(x)}$, $sinf(x)$ etc)		
Integration by inspection/recognition/reverse chain rule		
Differentiation by 1 st principles		
Higher derivatives		
Evaluating limits using L'Hopitals or Maclaurins Series		
Implicit Differentiation		
Rates of Change/Related Rates		
Optimisation (including where max/min occurs at an endpoint)		
Derivatives of • $a^{f(x)}$, • $\tan f(x)$ • $\sec(x)$		
• $cosec f(x)$		
• $\cot f(x)$		
• $\sin^{-1} f(x)$ • $\cos^{-1} f(x)$ • $\tan^{-1} f(x)$		
Harder integrals – Using the above functions including having to use partial fractions first and completing the square		
Integration by Parts		
Integration by Substitution		
Area about y axis		
Volume of revolution		
Differential Equations		
Euler's method		
Maclaurin's Series		