Topics tested /Not tested in 2013 H2 Math Paper 1

In general, the following topics have not been tested yet. For detailed analysis, please refer to the table below.

(1) Functions

(2) Maclaurin Series + Binomial Expansion

(3) Maxima/Minima + Rate of Change (but seldom tested)

(4) Transformations/Further Curves Sketching

(5) Recurrence Sequences

(6) Vectors (questions on lines, though they usually involve planes with column vectors given)

(7) Integration - by parts and volume of revolution

S/N	Topics	2013/P1	Remarks
1	Functions and graphs		
1.1	Concept of function, domain and range		Not tested
1.1.1	Find inverse functions		Not tested
1.1.2	Conditions for existence of inverse functions		Not tested
1.1.3	Find composite functions		Not tested
1.1.4	Conditions for existence of composite functions		Not tested
1.1.5	Relationship b/w function and its inverse as reflection in the line y = x		Not tested
1.2	Graphing Techniques		
1.2.1	Use of GC to graph a given function		Not tested
1.2.2	Relating the equation of $(x/a)^2 \pm (y/b)^2 = 1$ with its graph	Tested in Q5	

1.2.3	Relating the equation of y = (ax + b)/(cx + d) with its graph	Tested in Q3	
1.2.4	Relating the equation of y = (ax^2 + bx + c)/ (dx + e) with its graph	Tested in Q2	
1.2.5	Characteristics of graphs such as symmetry, intersection with axes, turning points and asympotes	Tested in Q3	This is a general concept that may reappear in P2
1.2.6	Determinating equations of asymptotes, axes of symmetry amd restrictions on the possible values of x and/or y	Tested in Q2/3	This is a general concept that may reappear in P2
1.2.7	Effect of transformation on the graphs of y = f(x) as represented by y = af(x)		Not tested
1.2.8	Effect of transformation on the graphs of y = f(x) as represented by y = f(x) + a		Not tested
1.2.9	Effect of transformation on the graphs of y = f(x) as represented by y = f(x + a)		Not tested
1.2.10	Effect of transformation on the graphs of y = f(x) as represented by y = f(ax)		Not tested
1.2.11	Relating the graphs of y = |f(x)| to y = f(x)		Not tested
1.2.12	Relating the graphs of y = f(|x|) to y = f(x)		Not tested
1.2.13	Relating the graphs of y = 1/f(x) to y = f(x)		Not tested
1.2.14	Relating the graphs of y^2 = f(x) to y = f(x)		Not tested
1.2.15	Simple parametric equations and their graphs	Concept was present in Q11	
1.3	Equations and Inequalities		
1.3.1	Solving inequalities of the form f(x)/g(x) > 0 where f,g are quadratic expressions that are factorisable or always positive	Tested in Q3	
1.3.2	Solving inequalities by graphical methods	Tested in Q3	
1.3.3	Formulating an equation or system of linear equations from a problem situation	SOLE was used in Q1	This is a general concept that may reappear in P2
1.3.4	Finding the numerial solution of equations using a	SOLE was used in Q1	This is a general concept that may

	GC		reappear in P2
2	Sequences and Series		
2.1	Summation of Series		
2.1.1	Relationship between U_n and S_n		Not tested
2.1.2	Sequence given by formula for the nth term		Not tested
2.1.3	Sequence generated by recurrance formula of the form $x_{n+1} = f(x_n)$		Not tested
2.1.4	Use of the Σ notation	Tested in Q9	
2.1.5	Summation of seies by MOD	Tested in Q9	
2.1.6	Convergence of series and sum to infinity		Not tested
2.1.7	Binomial expansion of $(1 + x)^n$ for any rational n		Not tested
2.1.8	Condition for convergence of a binomial series		Not tested
2.1.9	Proof by method of MI	Tested in Q9	
2.2	Arithmetic and Geometric Series		
2.2.1	Formula for the nth term and the sum of a finite arithmetic series		Not tested
2.2.2	Formula for the nth term and the sum of a finite geometric series	Tested in Q7	
2.2.3	Condition for convergence of an infinite geometric series	Concept was present in Q7	
2.2.4	Formula for the sum to infinity of a convergent geometric series	Tested in Q7	
2.2.5	Solving practical problems involving APs and GPs		Only GP problems were seen in P1
3	Vectors		
3.1	Vectors in 2 and 3 Dimension		
3.1.1	Addition and subtraction of vectors, multiplication of a vector by a scalar, and their geometric	Tested in Q6	This is a general concept that may reappear in P2

	interpretation			
3.1.2	Use of notation such as (x y), (x y z), x**i** + y**j**, x**i** + y**j** + z**k**, AB, **a**			This is a general concept that may reappear in P2
3.1.3	Position vectors and displacement vectors			This is a general concept that may reappear in P2
3.1.4	Magnitude of a vector			This is a general concept that may reappear in P2
3.1.5	Unit vectors			This is a general concept that may reappear in P2
3.1.6	Distance b/w 2 points			Not tested
3.1.7	Angle between a vector and the x, y or z axis			Not tested
3.1.8	Use of the ratio theorem in geometrical applications	Tested in Q6		
3.2	The Scalar and Vector Products of Vectors			
3.2.1	Concepts of scalar products and vector products of vectors	Concept was present in Q6		This is a general concept that may reappear in P2
3.2.2	Calculation of the magnitude of a vector and the angle between 2 directions			Not tested
3.2.3	Calculation of the area of triangle or parallelogram	Tested in Q6		
3.2.4	Other Geometrical meanings of |**a·b**| and |**a×b**| where **b** is a unit vector (eg. Length of projection and perpendicular length)			Not tested
3.3	Three-Dimnesional Geometry			
3.3.1	Vector and cartesian equations of lines and planes	Tested in Q1		Equations of planes were seen in Q1 but equations of lines were absent from P1
3.3.2	Finding the distance from a point to a line or to a plane			Not tested
3.3.3	Finding the angle b/w 2 lines, b/w a line and a plane, or b/w 2 planes			Not tested
3.3.4	Relationship b/w 2 lines (coplanar or skew)			Not tested

3.3.5	Relationship b/w a line and a plane			Not tested
3.3.6	Relationship b/w 2 planes			Not tested
3.3.7	Relationship b/w 3 planes	Tested in Q1		
3.3.8	Finding the intersections of lines and planes	Tested in Q1		
4	Complex Numbers			
4.1	Complex numbers expressed in cartesian form	Concept was present in Q4		
4.1.1	Extension of the number system from real numbers to complex numbers			This is a general concept that may reappear in P2
4.1.2	Complex roots of quadratic equations	Concept of roots was present in Q4		
4.1.3	Four operations of complex numbers expressed in the form x + iy			This is a general concept that may reappear in P2
4.1.4	Equating real and imaginary parts	Tested in Q4		
4.1.5	Conjugate roots of a polynomial equation with real coefficients	Tested in Q4		
4.2	Complex numbers expressed in polar form			
4.2.1	Complex numbers expressed in the form $r(\cos\theta + i\sin\theta)$ or $re^{i\theta}$ where $r > 0$ and $-\pi < \theta < \pi$	Concept was present in Q8		
4.2.2	Calculation of modulus and argument of a complex number	Tested in Q8		
4.2.3	Multiplication and division of 2 complex numbers expressed in polar form	Tested in Q8		
4.2.4	Representation of complex numbers in the Argand diagram	Tested in Q8		This is a general concept that may reappear in P2
4.2.5	Geometric effects of conjugating a complex number and of adding, subtracting, multiplying, dividing 2 complex numbers	Tested in Q8		
4.2.6	Loci such as $|z - c| \leq r$, $|z - a| = |z - b|$ and $\arg(z - a) = \alpha$			Not tested

5	Calculus		
5.1	Differentiation		
5.1.1	Graphical interpretation of f'(x) > 0, f'(x) = 0 and f'(x)< 0		Not tested
5.1.2	Graphical interpretation of f''(x) > 0 and f''(x) < 0		Not tested
5.1.3	Relating the graph of y = f'(x) to the graph of y = f(x)		Not tested
5.1.4	Differentiation of simple functions defined implicitly or parametrically	Tested in Q11	
5.1.5	Finding the numerical value of a derivative at a point using a GC		Not tested
5.1.6	Finding equations of tangents and normals to curves	Tested in Q11	
5.1.7	Solving practical problems involving differentiation (Max/Min) + rate of change		Not tested
5.2	Maclaurin's Series		
5.2.1	Derivation of the first few terms of the series expansion of $(1 + x)^n$, e^x, sin x, ln(1 + x) and other simple functions		Not tested
5.2.2	Finding the first few terms of the series expansion of sums and products of functions, e.g. $e^x \cos 2x$, using standard series		Not tested
5.2.3	Sin x $\approx$ x, cos x $\approx$ 1 - $1/2x^2$, tan x $\approx$ x		Not tested
5.2.4	Concepts of convergence and approximation		Not tested
5.3	Integration Techniques		
5.3.1	Integration of f'/f		Not tested
5.3.2	Integration of $\sin^2 x$, $\cos^2 x$ and $\tan^2 x$	Concept seen in Q5	
5.3.3	Integration of $1/(a^2 + x^2)$, $1/(a^2 - x^2)^{0.5}$, $1/(a^2 - x^2)$ and		Not tested

	$1/(x^2 - a^2)$		
5.3.4	Integration by a given substitution	Tested in Q5	
5.3.5	Integration by parts		Not tested
5.4	Definite Integrals		
5.4.1	Concept of definite integral as a limit of sum		
5.4.2	Definite Integrals as the area under a curve	Tested in Q11	
5.4.3	Evaluation of definite integrals	Concept was present in Q11	
5.4.4	Finding the area of a region bounded by a curve and lines parallel to the coordinate axes, b/w a curve and a line or b/w 2 curves	Tested in Q11	
5.4.5	Area below the x-axis		Not tested
5.4.6	Finding the area under a curve parametrically	Tested in Q11	
5.4.7	Finding the volume of revolution about the x or y axes		Not tested
5.4.8	Finding the numerical value of a definite integral using a GC		Not tested
5.5	Differential Equations		
5.5.1	Solving DEs of the form $\dot{y}' = f(x)$	Tested in Q10	
5.5.2	Solving DEs of the form $\dot{y}' = f(y)$	Concept present in Q10	
5.5.3	Solving DEs of the form $\dot{y}'' = f(x)$	Concept present in Q10	
5.5.4	Formulating a DE from a problem situtation	Tested in Q10	
5.5.5	Use of a family of solution curves to represent the general solution of a DE	Tested in Q10	
5.5.6	Use of an initial condition to find a particular solution	Concept present in Q10	
5.5.7	Interpretation of a solution in terms of the problem situation	Concept present in Q10	