Mathematics Department C2 SOW

Specification	Reference	Notes/Extra Material
1. Algebra and Functions		
 Simplifying algebraic fractions by division 	Heinemann Chapter 1 Section 1.1 - Exercise 1A	
 Dividing a polynomial by (x ± p) 	Section 1.2 - Exercises 1B & 1C	Only division by $(x + a)$ or $(x - a)$ will be required.
 Factorising a polynomial by using the Factor theorem 	Section 1.3 - Exercise 1D	Candidates should know that if $f(x) = 0$ when $x = a$, then $(x - a)$ is a factor of $f(x)$
Using the Remainder theorem	Section 1.4 - Exercise 1E	Candidates may be required to factorise cubic expressions such as $x^3 + 3x^2 - 4$ and $6x^3 + 11x^2 - x - 6$.
		Candidates should be familiar with the terms 'quotient' and 'remainder when the polynomial f(x) is divided by (ax + b).
	Summary of key points	Mixed Exercise 1F Revision Exercise 1

 2. Coordinate geometry in the (x,y) plane Coordinate geometry of the circle using the equation of a circle in 		Candidates should be able to find the radius and the coordinates of the centre of the circle given the equation of the circle, and vice versa.
the form $(x-a)^2 + (y-b)^2 = r^2$ and including use of the following circle properties i. the angle in a semicircle is a right angle ii. the perpendicular from the centre to a chord bisects the chord iii. the perpendicularilty of radius and tangent	Heinemann Chapter 4 Section 4.2 - Exercise 4C Section 4.1 - Exercise 4B Section 4.3 - Exercises 4D & 4E	Section 4.1 Exercise 4A
	Summary of key points	Mixed Exercise 4F Revision Exercise 4
3. Sequences and seriesGeometric sequencesGeometric progressions and the nth term	Heinemann Chapter 7 Sections 7.1 - Exercise 7A Sections 7.2- 7.3 - Exercises 7B & 7C	The general term and the sum to n terms are required
The sum of a finite geometric series	Section 7.4 - Exercise 7D	The proof of the sum formula should be known

 The sum to infinity of a convergent geometric series, including the use of the modulus of r. Binomial expansion of (1 + x)ⁿ for positive integer n. The notations n! and n 	Section 7.5 - Exercise 7E Summary of key points Heinemann Chapter 5 Section 5.1 - Exercise 5A Sections 5.2 – 5.4	Mixed Exercise 7F Expansion of (a + bx) ⁿ may be required.
(r)	- Exercises 5B, 5C & 5D Summary of key points	Mixed Exercise 5E Revision Exercises 7 & 5
4. Trigonometry	Heinemann Chapter 2	Revision Exercises / & 3
 The Sine and Cosine rules, and the area of a triangle in the form ½ ab sin C. 	Sections 2.1 – 2.7 - Exercises 2A, 2B, 2C, 2D, 2E, 2F & 2G	
	Summary of key points	Mixed exercise 2H
Radian measure, including use for arc length and area of sector.	Heinemann Chapter 6 Sections 6.1 – 6.4 - Exercises 6A, 6B & 6C	Use of the formula $s = r\theta$ and $A = \frac{1}{2}r^2\theta$ for a circle.
	Summary of key points	Mixed Exercise 6D
 Sine, Cosine and Tangent functions. Their graphs, symmetries and periodicity. 	Heinemann Chapter 8 Sections 8.1 – 8.5 - Exercises 8A, 8B, 8C, 8D, 8E & 8F	Knowledge of graphs of curves with equations such as y=3sinx, y = $\sin(x + \pi/6)$, y = $\sin 2x$ is expected. Mixed Exercise 8G

• Knowledge & use of $\tan \theta = \frac{\sin \theta}{\cos \theta}$ And $\sin^2 \theta + \cos^2 \theta = 1$	Section 10.1 - Exercise 10A	Candidates should be able to solve equations such as $\sin(x-\pi/2) = \sqrt[3]{4} \text{ for } 0 < x < 2\pi$
 Solution of simple trigonometric equations in a given interval 	Sections 10.2 – 10.4 - Exercises 10B, 10C & 10 D	Cos $(x + 30) = \frac{1}{2}$ for $-180 < x < 180$ Tan $2x = 1$ for $90 < x < 270$ $6\cos^2 x + \sin x - 5 = 0$ for $0 \le x < 360$
	Summary of key points	Mixed Exercise 10E Revision Exercises 2, 6, 8 & 10
5. Exponential and logarithms	Heinemann Chapter 3	
• y = a ^x and its graph	Section 3.1 - Exercise 3A	To include
Laws of logarithms	Sections 3.2 – 3.4 - Exercises 3B, 3C, & 3D	$log_a xy = log_a x + log_{ay}$ $log_a x/y = log_{ax} - log_{ay}$ $log_a x^k = k log_a x$ $log_a 1/x = - log_a x$ $log_a a = 1$
 The solution of equations of the form a^x = b 	Sections 3.5 – 3.6 - Exercises 3E & 3F	Candidates may use the change of base formula.
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	Summary of key points	Mixed exercise 3G Revision Exercise 3

 Applications of differentiation to maxima & minima and stationary points, increasing & decreasing functions. 	Heinemann Chapter 9 Sections 9.1 – 9.3 - Exercises 9A, 9B & 9C	The notation f"(x) may be used for the second derivative. To include applications to curve sketching. Maxima and minima problems may be set in the context of a practical problem.
	Summary of key points	Mixed Exercise 9D Revision Exercise 9
7. Integration	Heinemann Chapter 11	
 Evaluation of definite integrals Interpretation of the definite integral as the area under a curve. 	Section 11.1	Candidates will be expected to be able to evaluate the area of a region bounded by a curve and given straight lines. e.g. Find the finite area bounded by the curve $y = 6x - x^2$ and the line $y = 2x$
 Approximation of area under a curve using the trapezium rule. 	Section 11.5 - Exercise 11E	$\int x dy$ will not be required. e.g. Evaluate $_0\int^1 \sqrt{(2x+1)} dx$ using the values of $\sqrt{(2x+1)}$ at $x=0, 0.25, 0.5, 0.75$ and 1.
	Summary of key points	Mixed Exercise 11F Revision Exercise 11