澳門大學
UNIVERSIDADE DE MACAU
UNIVERSITY OF MACAU

澳門理工大學
Universidade Politécnica de Macau
Macao Polytechnic University

澳門旅遊學院
INSTITUTO DE FORMAÇÃO TURÍSTICA DE MACAU
Macao Institute for Tourism Studies

澳門科技大學
UNIVERSIDADE DE CIÊNCIA E TECNOLOGIA DE MACAU
MACAU UNIVERSITY OF SCIENCE AND TECHNOLOGY

2023 年澳門四高校聯合入學考試（語言科及數學科）

2023 Joint Admission Examination for Macao Four Higher Education Institutions (Languages and Mathematics)

考試大綱　Syllabus

數學附加卷　Mathematics Supplementary Paper

考試時間：一小時

數學科附加卷的考試大綱包括數學科考試大綱的內容，並加上：

1. 函數：函數的概念、定義域及值域。圖。反函數。

2. 立體幾何：簡易立體圖形，包括長方體、角柱、圓柱、角錐、直立圓錐、球體。

3. 線性方程組：不多於三個未知量。$n \times n$ 矩陣；矩陣加法及乘法 $(n \leq 3)$。行列式（階數不大於三）。

4. 解析幾何：切線與法線。極座標。

5. 三角：三角函數方程及其通解。

6. 基本微積分：多項式的和、差、積、商的微分法。極大值、極小值及拐點。多項式的不定積分。不定積分和定積分的簡易性質。利用定積分計算面積。

7. 曲線的描繪：偶、奇及週期函數。導數的應用。

8. 向量：純量與二維空間中的向量；向量加法及純量乘法。位置向量。笛卡兒分量。純量積。

9. 複數：虛數。複數的運算。二次多項式的複根。複數的極式。有理指數的棣美弗定理。n 次根。

附錄--數學符號

除了數學正卷所用到的符號外，數學附加卷亦會採用以下符號：

$f^{-1}(x)$	函數 $f(x)$ 的反函數。
$\overrightarrow{AB}$	從點 A 到點 B 的向量。
$\left\|\overrightarrow{AB}\right\|$	$\overrightarrow{AB}$ 的大小 (長度)。
$\overrightarrow{AB}\cdot\overrightarrow{CD}$	$\overrightarrow{AB}$ 與 $\overrightarrow{CD}$ 的純量積。
$\|A\|$	方陣 A 的行列式。
$\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$	y 的一階及二階導數。
$f'(x)$, $f''(x)$	$f(x)$ 的一階及二階導數。
$\int f(x)\,dx$	$f(x)$ 的不定積分。
$\int_a^b f(x)\,dx$	$f(x)$ 在區間 $[a, b]$ 上的定積分。
Re(z), Im(z), $\|z\|$, arg(z), $\bar{z}$	複數 z 的實部、虛部、模、幅角及共軛。

Examination Duration: 1 hour

The syllabus of the Mathematics Supplementary Paper includes the contents in the Mathematics Examination Syllabus, together with:

1. Functions: Concept of function, domain and range. Graphs. Inverse functions.

2. Solid Geometry: Simple solid figures, including rectangular block, prism, cylinder, pyramid, right circular cone and sphere.

3. System of Linear Equations: No more than three unknowns. $n \times n$ matrices: addition and multiplication of matrices ($n \leq 3$). Determinants (up to order 3).

4. Coordinate Geometry: Tangent and normal. Polar coordinates.

5. Trigonometry: Trigonometric equations and general solutions.

6. Basic Calculus: Differentiation of a sum, a difference, a product, and a quotient of polynomials. Maxima, minima and inflection points. Indefinite integral of polynomials. Simple properties of indefinite integrals and definite integrals. Area by integration.

7. Curve Sketching: Even, odd and periodic functions. Application of derivatives.

8. Vectors: Scalars and vectors in 2-dimensional space; vector addition and scalar multiplication. Position vectors. Cartesian components. Scalar product.

9. Complex Numbers: Imaginary numbers. Manipulation of complex numbers. Complex roots of quadratic equations. Polar form of complex numbers. De Moivre's theorem for rational indices. n-th root.

Appendix – Mathematical Symbols

In addition to those notations used in the Mathematics Standard Paper, the Mathematics Supplementary Paper adopts the following notations:

$f^{-1}(x)$	Inverse function of the function $f(x)$.
$\overrightarrow{AB}$	Vector from point *A* to point *B*.
$\left\|\overrightarrow{AB}\right\|$	Magnitude (length) of $\overrightarrow{AB}$.
$\overrightarrow{AB}\cdot\overrightarrow{CD}$	Scalar product of $\overrightarrow{AB}$ and $\overrightarrow{CD}$.
$\|A\|$	Determinant of the square matrix *A*.
$\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$	First and second derivatives of *y*.
$f'(x)$, $f''(x)$	First and second derivatives of $f(x)$.
$\int f(x)\,dx$	Indefinite integral of $f(x)$.
$\int_a^b f(x)\,dx$	Definite integral of $f(x)$ over interval [*a*, *b*].
Re(z), Im(z), $\|z\|$, arg(z), $\bar{z}$	The real part, imaginary part, modulus, argument, and conjugate of the complex number *z*.