



香港科技大學
THE HONG KONG
UNIVERSITY OF SCIENCE
AND TECHNOLOGY

HKUST Dual Program 2023 **(Introduction to Pre-stage Level: Mathematics)**

9 September 2023 (Sat)

About Pre-stage (MATH) Course

Content:

Mainly based on selected topics of **HKDSE Core Mathematics**, with some **additional topics and applications** delivered

Course Instructors:

Dr. Hugo Wai Leung MAK (Class A, English)

Mr. Hoi Sang KONG (Class B, Chinese)

Dr. Kwun Lun Alan CHU (Class C, English)

Common Lecture Notes (in English) will be used for all classes

Duration:

16 “**3-hour lectures**” plus 2 “**3-hour tutorials**”, **Saturdays of Nov 2023 – May 2024**
(2:00 pm – 5:00 pm)

https://cdgt.hkust.edu.hk/sites/cdgt.prod01.ust.hk/files/Dual%20Program/L1/2023TimetableL1/MATH_2023DPPS_REF.pdf

Pre-requisites*:

Basic understanding of **elementary Algebra**

Certain **mathematical maturity / related experience** will be a bonus

*** From 2022/23 onwards, all Pre-stage applicants are required to sit for a screening test.**

The performance will be an important selection criteria.

About Pre-stage Course

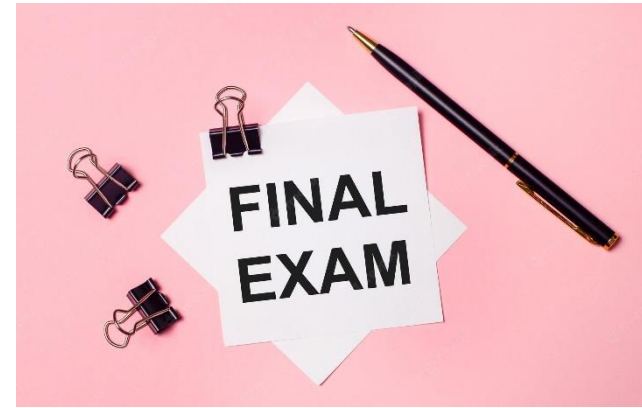
Assessment:

4 HWs (30%)

1 Midterm Test (17 Feb 2023) (30%)

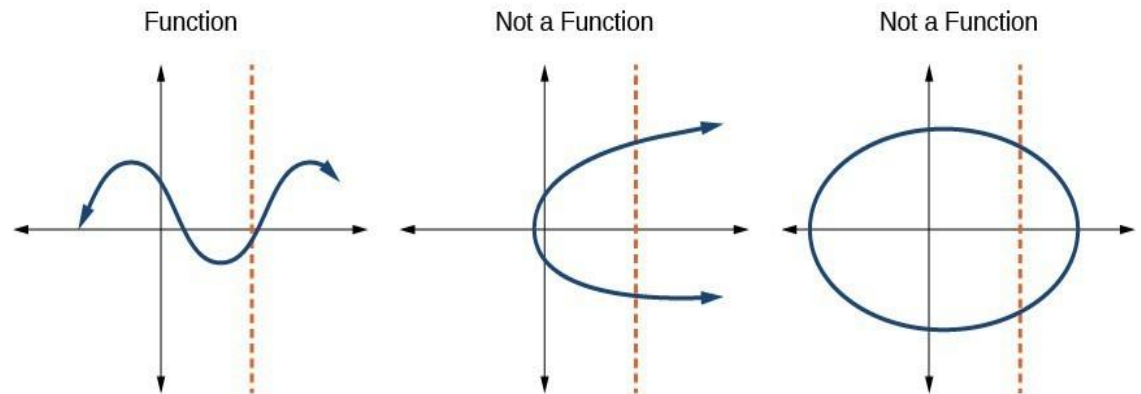
1 Final Examination (4 May 2023) (40%).

***Outstanding students will be promoted to DP Level 1.**



Topics Covered:

- Numbers and Basic Algebra
- Polynomials and Binomial Theorem
- Functions and its Geometric Representations
- Coordinate Geometry
- Trigonometric Formulae
- Sequences and Series



Brief Descriptions of Topics

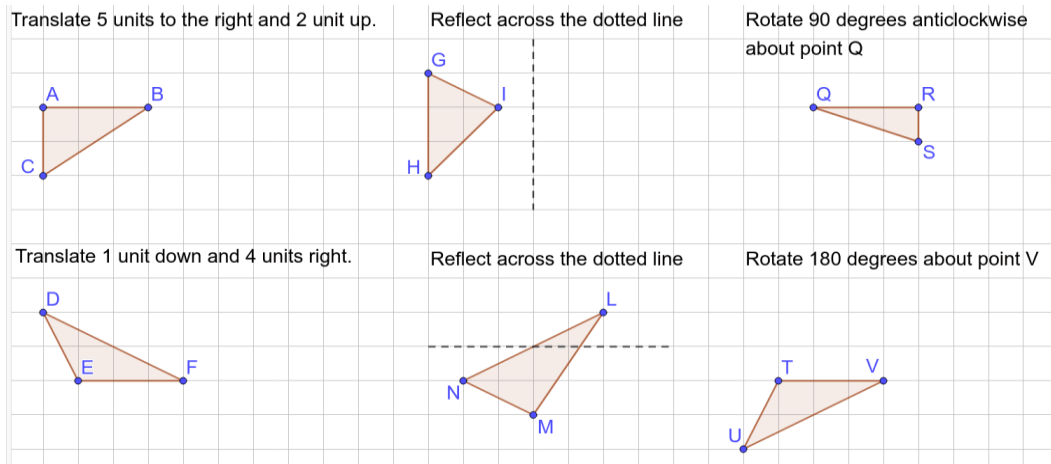
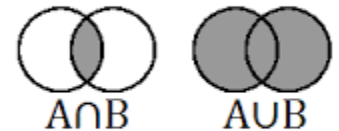
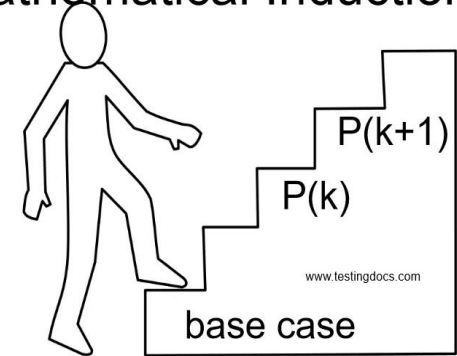
Numbers and Basic Algebra: Basic Set Theory and Number System, Division Algorithm, Mathematical Induction, Proof by Contradiction etc.

Polynomials and Binomial Theorem: Algebra of Polynomials, Partial Fraction Decomposition, Factor and Remainder Theorem, Binomial Theorem

Functions and its Geometric Representations: Definition of a Function, Graphs of a Function, Trigonometric Functions and some Geometric applications

Coordinate Geometry: Coordinate System, Geometric Transformation (e.g., Translation and Rotation)

Mathematical Induction



Brief Descriptions of Topics

Trigonometric Formulae: Trigonometric Functions on the Coordinate Plane, Compound Angle Formula, Sum to Product / Product to Sum, Half Angle Formula

Sequences and Series:

Arithmetic Sequence and Series
 Geometric Sequence and Series
 Daily Life Applications and Usage

Sum to Product Formulas

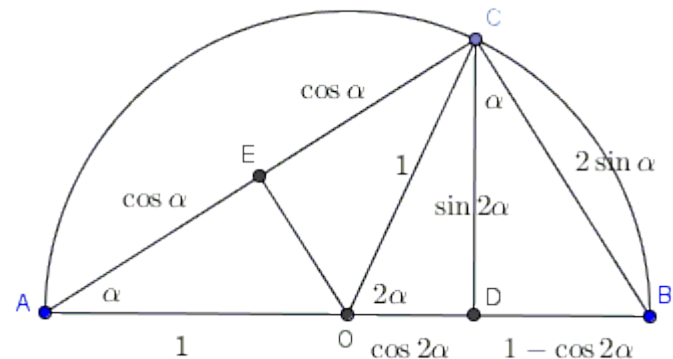


$$\sin A + \sin B = 2 \sin \left(\frac{A+B}{2} \right) \cos \left(\frac{A-B}{2} \right)$$

$$\sin A - \sin B = 2 \sin \left(\frac{A-B}{2} \right) \cos \left(\frac{A+B}{2} \right)$$

$$\cos A - \cos B = -2 \sin \left(\frac{A+B}{2} \right) \sin \left(\frac{A-B}{2} \right)$$

$$\cos A + \cos B = 2 \cos \left(\frac{A+B}{2} \right) \cos \left(\frac{A-B}{2} \right)$$



Screening Test (applicable for both Pre-stage and Level 1)

Online Screening Test (via Zoom)

Date: 7 October 2023 (Sat)

Time: 11 am – 12 noon (Student must enter prescribed Zoom meeting at 10:30 am)

Format: Multiple Choice Problems & Fill in the Blanks

Targets:

- All applicants of Math Pre-stage
- Applicants of Math Level 1 who have **NOT** obtained Grade B or above in Math Pre-stage Level

Closed book test, with **NO** calculators and textbooks etc. allowed

More details are provided in the Section of “**Selection**” in the following link:

<https://cdgt.hkust.edu.hk/dp2023mathscreening-test>





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Any questions about CDGT MATH?

CDGT Contact Email: cdgt@ust.hk

Contact Email of Program Coordinator (MATH):

Dr. Hugo Wai Leung MAK mahwlmak@ust.hk

**Wish you ALL a fruitful
learning journey at HKUST!**

See you!