



Quadratic Functions and Standard Conics (E2MAT003C)

Introduction

In 17th century, Descartes has introduced the rectangular coordinate system. With this concept, a curve can be considered as a collection of points (x,y) on the coordinate plane and we can set up an equation which can help us to find out some geometric properties of the curve and to solve problems of analytical geometry by algebraic method. In this course, some standard quadratic functions (or conics) like parabola, circle, ellipse and hyperbola will be introduced and the properties will be explored.

This is the last programme in the **Subject Core Series** which is comprised of four level 2 programmes. They are namely

1. Equations and Identities
2. Handling Sequences and Series
3. Plane Geometry
4. Quadratic Functions and Standard Conics

Programme Type / Level

Analytical Study Course (Level II) ([Token-required](#))

Instructor(s)

Mr Tse Siu On

Pre-requisite

Students should be able to:

- Basic skills in handling quadratic equations.
- Basic idea of function and graph.
- Basic knowledge on coordinate geometry such as distance formula, slope of straight line, etc.
- Basic properties of circle like chords and tangents.

Target Participants

- 1 to S3 HKAGE student members
- Class size: 30

This programme is the same as Analytical Study Course (Level 2): Quadratic Functions and Standard Conics (MATS2610) in 19/20 school year.

Medium of Instruction

Cantonese with English Handouts

Certificate

E-Certificate will be awarded to participants who have:

- ❖ Attended **AT LEAST 3** sessions AND
- ❖ Attained **satisfactory performance** in all assessments.

Intended Learning Outcomes

Upon completion of the programme, participants should be able to:

1. Evaluate competently the optimal value of a quadratic function through graph sketching;
2. Analyze the natures of loci;
3. Construct accurately equations of circles with given information;
4. Understand the definition of conics and their equations in standard position.

Application Deadline

9 Nov 2020
12:00 n.n.

Application Result Release Date

20 Nov 2020

If student members withdraw from the programme after the Application Deadline, the token will be deducted.

Schedule

Session	Date	Time	Venue (HKAGE)
Screening Test	14 Nov	10:00 a.m. – 11:00 a.m.	Room 105
1	5 Dec	2:00 p.m. – 5:00 p.m.	Room 303
2	12 Dec		Room 203
3	19 Dec		Room 105
4	23 Dec		Room 105

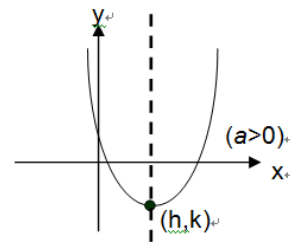
Remarks: For any assessment to be held in the programme, no make-up will be arranged.

Sample Example for the Programme

--- Optimal values of quadratic functions.

Given the function $y = a(x - h)^2 + k$. We have,

- (a) The vertex (h, k) .
- (b) The axis of symmetry which is the line $x = h$.



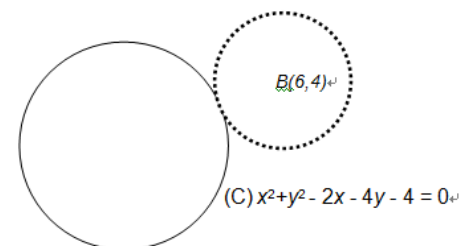
--- Different forms of straight line.
Point-slope form.

The equation of the line with slope m and passes through the point (x_1, y_1) is $\frac{y - y_1}{x - x_1} = m$.

--- Example

Given the circle (C) $x^2 + y^2 - 2x - 4y - 4 = 0$,

- (a) Find the centre and radius of (C).
- (b) Show that $B(4, 6)$ lies outside (C).
- (c) Find the equation of the circle centre at B and touches (C)
 - (i) externally
 - (ii) internally



Enquiries

For enquiries, please contact Academic Programme Development Division on 3940 0101 after language selection, press "1".