Dawood public school
Secondary section
Syllabus for the year 2010-11
Class IX(S C)
Additional Mathematics (4037)

Syllabus Aims

The course should enable students to:

1. Consolidate and extend their elementary mathematical skills, and use these in the context of more advanced techniques;
2. Further develop their knowledge of mathematical concepts and principles, and use this Knowledge for problem solving;
3. Appreciate the inter connectedness of mathematical knowledge;
4. Acquire a suitable foundation in mathematics for further study in the subject or in mathematics related subjects;
5. Devise mathematical arguments and use present them precisely and logically;
6. Integrate information technology to enhance the mathematical experience;
7. Develop the confidence to apply their mathematical skills and knowledge in appropriate situations;
8. Develop creativity and perseverance in the approach to problem solving;
9. Derive enjoyment and satisfaction from engaging in mathematical pursuits, and gain an appreciation of beauty, power and usefulness of mathematics.

Assessment Objectives

The examination will test the ability of candidates to:

1. Recall and use manipulative technique;
2. Interpret and use mathematical data, symbols and terminology;
3. Comprehend numerical, algebraic and spatial concepts and relationships;
4. Recognize the appropriate mathematical procedure for a given situation;
5. Formulate problems into mathematical terms and select and apply appropriate techniques of solution.

Examination Structure

There will be one paper of 2 hours carrying 75 marks, in Mid term Examinations;
And one paper, of 2 hours and 30 minutes carrying 100 marks in Final Examinations.
Paper will consist of approximately 10-12 questions of various lengths. There will be no choice of question in the paper.

Electronic Calculators

The use of silent electronic calculators is expected in O level Additional Mathematics (4037).Calculators with any of the following facilities are prohibited, unless specifically stated otherwise in the syllabus.

- Graphic display
- Data banks
- Dictionaries
- Language translators
- Retrieval or manipulation of text or formulae
- QWETRY keyboards
- Built–in symbolic algebraic manipulations
- Symbolic differentiation or integration
- Capability of remote communication with other machines.

Mathematical Instruments

Apart from the usual mathematical instruments, candidates may use flexicurves in this examination.

Detailed Syllabus

Knowledge of the content of Ordinary level Syllabus D is assumed. Ordinary level material which is nor repeated in the syllabus below will not be tested directly but it may be required in response to questions on other topics.
Proof of results will not be required unless specifically mentioned in the syllabus

Syllabus Book

Ho Soo Thong et. Al, 2002; *New Additional Mathematics (Revised 2002),* Singapore, Paramount Publisher.

Syllabus contents	Pg no.	Month	Curriculum objectives	Assessment
1. Simultaneous equations	30-35	August	−solve simultaneous equations in two unknowns with at least one linear equation.	• Test will be taken
2. Indices, surds and logarithms	36-57	Aug/Sep	−perform simple operations with indices and with surds, including rationalising the denominator; −know and use the laws of logarithms (including change of base of logarithms); −solve equations of the form $a^x = b$.	• Assignment will be given. • Test will be taken.
3. Quadratic functions	61-80	Oct/Nov	−find the maximum or minimum value of the quadratic function $f : x \mapsto ax^2 + bx + c$ by any method; −use the maximum or minimum value of $f(x)$ to sketch the graph or determine the range for a given domain; −know the conditions for $f(x) = 0$ to have (i) two real roots, (ii) two equal roots, (iii) no real roots; and the related conditions for a given line to (i) intersect a given curve, (ii) be a tangent to a given curve, (iii) not intersect a given curve; −solve quadratic equations for real roots and find the solution set for quadratic inequalities.	• Test will be taken. .
		Dec		• Mid term Examinations

Syllabus Contents	Pg. No.	Month	Curriculum Objectives	Assessment
4. Factors of polynomials	83-95	Jan	−know and use the remainder and factor theorems; −find factors of polynomials; −solve cubic equations.	• Test will be taken.
5. Matrices	102-139	Jan/Feb	−display information in the form of a matrix of any order and interpret the data in a given matrix; −solve problems involving the calculation of the sum and product (where appropriate) of two matrices and interpret the results; −calculate the product of a scalar quantity and a matrix; −use the algebra of 2 x 2 matrices (including the zero and identity matrix); −calculate the determinant and inverse of a non-singular 2 x 2 matrix and solve simultaneous line equations.	• Test will be taken.
6. Coordinate geometry	144-171	Feb/Mar	−interpret the equation of a straight line graph in the form $y = mx + c$; −solve questions involving mid-point and length of line; −know and use the condition for two lines to be parallel or perpendicular.	• Assignment will be given.

Syllabus Contents	Pg no.	Month	Curriculum Objectives	Assessment
7. Linear law	176-192	Mar	−interpret the equation of a straight line graph in the form $y = mx + c$; −transform given relationships, including $y = ax^n$ and $y = Ab^x$, to straight line form and hence determine unknown constants by calculating the gradient or intercept of the transformed graph.	• Assignment will be given.
8. Functions	196-229	Mar/Apr	−understand the terms function, domain, range (image set), one-one function, inverse function and composition of functions; −use the notation $f(x) = \sin x$, $f: x \mapsto \lg x$, $(x > 0)$, $f^{-1}(x)$ and $f^2(x)$ $[=f(f(x))]$; −understand the relationship between $y = f(x)$ and $y = \lvert f(x) \rvert$, where $f(x)$ may be linear, quadratic or trigonometric; −explain in words why a given function is a function or why it does not have an inverse; −find the inverse of a one-one function and form composite functions; −use sketch graphs to show the relationship between a function and its inverse.	• Assignment will be given.
		May		• Final Examinations

Mathematical Notation

The list which follows summarizes the notation used in the CIE's Mathematics examinations.

1. Miscellaneous Symbols

=	is equal to
≠	is not equal to
≡	is identical to or is congruent to
≈	is approximately equal to
≅	is isomorphic to
∝	is proportional to
<	is less than
>	is greater than
≤	is less than or equals to
≥	is greater than or equals to
∞	infinity

2. Operations

$a + b$	a plus b
$a - b$	a minus b
a x b, ab, a.b	a multiplied by b
a ÷ b, a/b	a divided by b
a : b	the ratio of a to b
$\sqrt{a}$	the positive square root of the real number a
$\lvert a \rvert$	the modulus of the real number a

3. Functions

f	function f
f (x)	the value of the function f at x
f : A → B	f is a function under which each element of set A has an image in set B
$f : x \mapsto y$	the function f maps the element x to the element y
f^{-1}	the inverse of the function f
g o f, gf	the composite function of f and g which is defined by (g o f)(x) or gf (x) = g(f(x))

4. Matrices

M	a matrix M
M^{-1}	the inverse of the square matrix M
M^{T}	the transpose of the matrix M
det M	the determinant of the square matrix M

Referrence Booklist
O Level Additional mathematics 4037

Suggested Books
Backhouse, J K and Houldsworth S P T Essential Pure Mathematics: A First Course
(Longman, 1991) 0582066581.
Backhouse, J K and Houldsworth S P T Pure Mathematics: A First Course (Longman, 1985) 0582353866.
Bostock L and Chandler S Mathematics: Core Maths for Advanced Level (Nelson Thornes, 2000)
0748755098.
Bostock L and Chandler S Mathematics: Pure Mathematics 1 (Nelson Thornes, 1978)
0859500926
Emanuel, R Pure Mathematics 1 (Longman, 2001) 0582405505
Harwood Clarke, L Additional Pure Mathematics (Heinemann, 1980) 0435511874
Talbert, J F Additional Maths Pure and Applied (Longman, 1995) 0582265118