

MATHEMATICS SYLLABUS FORM 4 2009-2010

Text books being used: STP BOOK 3 EXTENDED MATHEMATICS FOR IGCSE

FIRST TERM

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| 1 | <i>Algebraic Fractions</i> | Book 3 |
| a. | Revision of finding the factors of algebraic expressions. | Chapters 12, 23. |
| b. | Simplification of algebraic fractions | |
| | i. addition and subtraction | EXTENDED MATHS. |
| | ii. Multiplication and division. | CHAPTER 2 AND 5 |
| c. | Solving of equation involving fractions. | |
| d. | Solving of Quadratic Equations by factors; formula; and completing the square. | |
| e. | Solving of problems involving fractions and quadratic equations. | |
| 2. | Indices. | |
| a. | Revision of the basic rules of indices. Refer to Form 3 syllabus. | EXTENDED MATHS |
| b. | The use of calculator to evaluate powers and roots. | CHAPTER 5 |
| c. | Finding the power in a given equation. | SECTION 5.4 |
| d. | Simple calculations involving numbers in the standard form. | |
| 3. | Inequalities. | Book 3 |
| a. | Revision of the graphical representation of line graphs. | Chapter 21 |
| b. | Graphical representation of inequalities: solution of linear inequalities using two variables. | EXTENDED MATHS |
| | Representation of solutions in the Cartesian Plane. | CHAPTER 5 |
| | The Maximum / Minimum value of a function in a region. | SECTION 5.5 |
| | e.g. $y = c$, $y = mx$, $y = mx + c$ | |
| 4. | Literal Equations:
Changing the subject of a formula. | EXTENDED MATHS
CHAPTER 5
SECTION 5.2 |
| 5. | Matters Financial. | Book 3 |
| a. | Investments: | Chapter 5 (parts) |
| | i. Simple interest | EXTENDED MATHS |
| | ii. Compound interest. The calculation of compound interest year by year. The use of the formula for compound interest. Use of the calculator to find A, P, r and n. | CHAPTER 1 |
| | iii. Appreciation and Depreciation | SECTION 1.6. |
| | iv. Periodic Borrowing and Repayments. | . |
| b. | Exchange Rate Calculations. | |
| c. | Calculation of tax, insurance and commission. | |
| d. | Bank charges. | |

SECOND TERM

6. Congruency of triangles and the properties of a parallelogram. Application to harder cases
7. Graphs.
a. Using a graph to solve a quadratic function.
b. Simple deductions from graphs such as maxim and minima.
c. Finding the gradient of the tangent at a point on the curve.
d. Use of graphs to find an approximate solution of equations by the intersection of two graphs one of which at least must be linear.
Graphs of cubic functions.
8. Areas and Volumes.
a. Area of triangle, parallelogram, rhombus, trapezium, Sectors of a circle, area of polygons. The use of formula $A = \frac{1}{2} ab \sin C$ for the area of a triangle and $A = ab \sin C$ for the area of a parallelogram to be included.
Volume of regular figures: cylinder and prism.
b. Volume of irregular figures: pyramid, cone and sphere.
c. Surface area and total surface area of regular and irregular three-dimensional figures: Pyramids, Cones and Spheres.
d. Rate of flow of a liquid through a pipe.
Length of an arc.
Menstruation of simple composite shapes including the volume of a frustum.

THIRD TERM

9. Similarity.
Definition of similarity and the application of theorems to finding the values of missing sides to similar figures.
Intercept Theorem.
Ratio of areas and volume of similar figures.

Students are expected to discover and establish the relative geometrical results.

Students are expected to make conjectures arising from their observations and their results and then to present a proof to establish the general result.

EXTENDED MATHS

CHAPTER 4

SECTION 4.3 (PAGE 122)

SECTION 4.4 (PAGE 127)

EXTENDED MATHS.

CHAPTER 7

EXTENDED MATHS.

CHAPTER 3

EXTENDED MATHS

CHAPTER 4

SECTION 4.4 (PAGE 124)

Refer to note on the second column in topic 5.

Students are expected to make conjectures arise from their observation and the present a proof to establish a general result.

10. Circle properties:
- i. Chord properties in a circle: (a) Equal chords are equidistant from the centre and converse. (b) The perpendicular from the centre will bisect the chord and converse.
 - ii. Revision of angle properties Refer to form 3 syllabus.
 - iii. Tangent property (a) a tangent is perpendicular to the radius at the point of contact to a circle. (b) Tangents to the same circle from an external point are equal. (c) The alternate segment theorem.

Book 3
Chapter 10
EXTENDED MATHS.
CHAPTER 4
SECTION 4.5

Refer to notes on the second column in topics 5 and 8.

Structured questions leading to the proofs of angle properties may be set.

Structured questions involving the use of congruency of triangles to prove the symmetrical properties of a circle may be set.

11. Probabilities.
- a. Revision of meaning probability, the use of probability space and probability tree.
 - b. The difference between independent and dependent events.

EXTENDED MATHS.
CHAPTER 10
SECTION 10.4 (PAGE 327)

- c. Application of probabilities to express solves experimental data.

12. Transformations.

- a. Geometrical constructions of the four main types of transformations USING PENCIL AND PAPER METHOD AND **NOT** PURELY BY INSPECTION:
 - i. Translation by a given vector.
 - ii. Reflection to include reflection in the line $y = \pm x$.
 - iii. Rotation about a given point restricted to multiples of 90° . Finding the centre and the angle of rotation
 - iv. Enlargement with positive and negative scale factors. (To include fractional scale factors).
- b. Combined Transformations of 2- D shape. Identify a transformation as a reflection, translation, rotation or enlargement or a combination of basic transformations. The use of appropriate language to describe fully the transformation is expected.
- c. Combined Transformations of 2- D shape. Identify a transformation as a reflection, translation, rotation or enlargement or a combination of basic transformations. The use of appropriate language to describe fully the transformation is expected.

Book 2
Chapters: 8, 9 and 13.

EXTENDED MATHS.
CHAPTER 9 (parts) the use of matrices to work out transformations is to be disregarded.

Marks are going to be given for assessment purposes throughout the scholastic year. These marks are going to be based on the following:

- i. **The student's ability to answer direct exploratory questions set IN CLASS and his ability to answer them within set time limit**
- ii. **MENTAL TESTS WORKED OUT IN CLASS.**
- iii. **Computer material set on work sheets and worked out AT SCHOOL in the school computer laboratory.**
- iv. **Revision homework set on questions similar to those set in annual examinations. Topics covered in Form 4 form part of the SEC Syllabus and these topics will not be covered in full detail again in Form 5. As a result some of the revision questions set in these revision home works may be bases on questions set in SEC examinations.**