

ST. MAARTEN ACADEMY



MATHEMATICS DEPARTMENT

FORM 4

SYLLABUS FOR 2023 - 2024

Caring, Learning, Achieving, Excelling

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FORM FOUR

GENERAL OBJECTIVES

1. To use problem solving language and communication – making connections within and outside mathematics while using logical, formal and informal reasoning in problem solving contexts.
2. To use symbolic reasoning to represent mathematical concepts and the relationship among them.
3. To understand that shapes and figures provide powerful ways to connect mathematical and real world situations.
4. To realise the importance of decision making as applied to mathematics and the real world.
5. To perceive functions and equations as means of analyzing and understanding a broad variety of relationships and as a general tool for expressing generalisations.
6. To use mathematical methods to model and solve real-life problems involving money and specific data.
7. To understand that spatial reasoning plays a critical role in geometry.
8. To communicate mathematical ideas using language, efficient tools, appropriate units, numerical, physical or algebraic mathematical models.

TOPICS:**FORM FOUR*****TERM ONE***

NOTE: Coordinate Geometry from 3rd form (pg. 27) is carried over to 4th form and will be covered before the following regular 4th form topics.

3 weeks

- | | | |
|----|--|---------|
| 1. | Algebraic Expressions | 1 week |
| 2. | Functions and Graphs | 3 weeks |
| 3. | Trigonometry | 3 weeks |
| 4. | Literal equations (Change of subject of a formula) | 2 weeks |
| 5. | Quadratic Equations (by factorization) | 1 week |

TERM TWO

- | | | |
|----|--|---------|
| 1. | Quadratic Equations (by factorization) continued | 1 week |
| 2. | Statistics and Probability | 3 weeks |
| 3. | Transformation: Rotation | 3 weeks |
| 4. | Enlargement | 2 weeks |
| 5. | Measurement (Surface Area and Volume) | 2 weeks |

TERM THREE

- | | | |
|----|--|---------|
| 1. | Surface area and Volume (continuation from term 2) | 1 week |
| 2. | Matrices | 3 weeks |
| 3. | Revision | |

NB: For various reasons, often the last topic (or topics) from term one is/are carried over into term two; the same goes for term two to term three.

NOTE: Coordinate Geometry from 3rd form is to be done before these topics, in 3 weeks.

WK	TOPIC	OBJECTIVES	ASSESSMENT
(4)	ALGEBRA Fractional expressions	<ul style="list-style-type: none"> Simplify algebraic expressions with non-numerical denominators: <p>(i) $\frac{a^2 - b^2}{a^2 + b^2} - \frac{a^2 - b^2}{a^2 - b^2}$ (ii) $\frac{a^2 - b^2}{a^2 + b^2} + \frac{a^2 - b^2}{a^2 - b^2}$</p> <p>(ii) $\frac{a^2 - b^2}{a^2 + b^2} - \frac{a^2 - b^2}{a^2 - b^2}$</p>	Class work Homework Quiz Test
(5)	FUNCTIONS AND GRAPHS Symbols Linear functions Quadratic functions	<ul style="list-style-type: none"> Define and recognise function Differentiate between relation, mapping and function Represent a function by <ol style="list-style-type: none"> use of symbols drawing arrow diagrams graphs Compute the value of a function Differentiate between a linear function and a quadratic function 	Class work Homework Quiz
(6)	Quadratic functions	<ul style="list-style-type: none"> Identify quadratic functions from a set of functions. Draw the graph of a quadratic function Analyze the graph of a quadratic function: Equation of line of symmetry, turning point (nature), etc. 	Class work Homework Quiz Test
(7)	Quadratic functions; Simultaneous equations	<ul style="list-style-type: none"> Solve a quadratic equation using its graph Solve simultaneous equations (one linear and one quadratic) using their graphs 	Class work Homework Quiz

WK	TOPIC	OBJECTIVES	ASSESSMENT
(8)	TRIGONOMETRY Right- angled triangle Trigonometric ratios	<ul style="list-style-type: none"> Identify the hypotenuse, opposite side and adjacent as each relates to one of the acute angles in a right-angled triangle. Define sine, cosine and tangent of an angle θ where $0^\circ < \theta < 90^\circ$. Evaluate sine, cosine and tangent of an angle θ where $0^\circ < \theta < 90^\circ$. Find the angle θ where $0^\circ < \theta < 90^\circ$ given sine, cosine or tangent of θ. Calculate sides and acute angles of a right-angled triangle using the appropriate trigonometric ratio. 	Class work Homework Quiz Test
(9)	Angle of elevation and depression	<ul style="list-style-type: none"> Apply trigonometric ratios to solve problems related to <ol style="list-style-type: none"> Angle of elevation Angle of depression 	Class work Homework Quiz Test
(10)	Bearings	<ul style="list-style-type: none"> Apply trigonometric ratio to solve problems related to three-figure bearings 	Class work Homework Quiz , Test
(11)	LITERAL EQUATIONS Subject of formulae	<ul style="list-style-type: none"> Change the subject of formulae with simple formulae and those with fractions. 	Class work Homework Quiz
(12)	Subject of formulae	<ul style="list-style-type: none"> Change the subject of formulae with roots and power 	Class work Homework Quiz , Test
(13)	SOLUTION OF QUADRATIC EQUATIONS	<ul style="list-style-type: none"> Solve quadratic equations by factorization. 	Class work Homework

WK	TOPIC	OBJECTIVES	ASSESSMENT
(1)	SOLUTION OF QUADRATIC EQUATIONS (continuation)	<ul style="list-style-type: none"> Solve simple word problems using quadratic equations (factorization). Solve equations with fractions giving rise to quadratic equations. 	Class work Homework Quiz Test
(2)	STATISTICS & PROBABILITY	<ul style="list-style-type: none"> Review calculation of the mean and median from a frequency table. Define range, interquartile range and semi-interquartile range. Determine the range, quartiles, interquartile range and semi-interquartile range from a given set of data. Divide a given set of data into class intervals. Construct a grouped frequency table for data. Construct a frequency distribution for ungrouped and grouped data. Define class range, class limits, class midpoints and class boundaries. Determine class size (width), class limits, class mid-points and class boundaries for grouped data. 	Class work Homework Quiz
(3)	STATISTICS	<ul style="list-style-type: none"> For a grouped frequency distribution, determine: <ol style="list-style-type: none"> An estimate of the mean The modal class An estimate of the median or the interval in which the median lies. For a grouped frequency distribution, draw <ol style="list-style-type: none"> a histogram a frequency polygon 	Class work Homework Quiz

WK	TOPIC	OBJECTIVES	ASSESSMENT
(5)	TRANSFORMATIONS Rotation	<ul style="list-style-type: none"> Recognize that rotation is one type of geometrical transformation. (reflection, translation and enlargement are others.) Rotate points, lines and plane figures given the angle, direction and centre of rotation. Recognize that a 180° rotation of a triangle about the mid-point of one of its sides, results in a parallelogram being formed by the triangle and its image combined. Rotate any plane figure in the $x - y$ plane with various centers of rotation. Deduce that a reflection through a point is the same as a 180° rotation about that point. 	Class work Homework Quiz
(6)	TRANSFORMATION Rotation (Incorporate reflection and translation from Form 2)	<ul style="list-style-type: none"> Construct the centre of rotation given the object and its image, and state the magnitude and direction of rotation Deduce that reflection in two intersecting lines is equivalent to a rotation (centre of rotation is the point where lines intersect). Deduce that reflection in two parallel lines is equivalent to a translation. 	Class work Homework Quiz
(7)	TRANSFORMATION Rotation Glide reflection	<ul style="list-style-type: none"> Define rotational symmetry. Define the term 'order of symmetry'. Write the order of rotational symmetry for plane figures Define and carry out a glide reflection. State the relations between an object and its image under a glide reflection. 	Class work Homework Quiz Test

(8)	ENLARGEMENT	<ul style="list-style-type: none"> • Draw the enlargement of an object given the centre of enlargement and the scale factor (both positive and negative). • Find the centre of enlargement and the scale factor given the object and its image. • Explain the meaning of ‘congruent’ and ‘similar’ figures. 	
(9)	ENLARGEMENT Maps and scales	<ul style="list-style-type: none"> • Calculate the ratio of the areas of a figure and its image under an enlargement. • Calculate distance and area, under an enlargement given necessary information. • Use a map and its scale to calculate distances and areas. 	Class work Homework Quiz Test
(10)	MEASUREMENT Surface Area	<ul style="list-style-type: none"> • Find the surface area of simple right prisms (including a cuboid and a cylinder), pyramids (cone included) and a sphere. • Convert S.I. units of area (eg. m^2 to cm^2). 	Class work Homework Quiz Test
(11)	Volume	<ul style="list-style-type: none"> • Find the volume of the above solids. • Convert S.I. units of volume/capacity. 	Class work Homework Quiz

WK	TOPIC	OBJECTIVES	ASSESSMENT
1	SURFACE AREA and VOLUME (continuation)	Solve problems involving volume and surface area	Class work Homework Test
2	MATRICES	<ul style="list-style-type: none"> • Explain concepts associated with matrices (row, column, order, type of matrices and practical uses) • Perform addition, subtraction, multiplication and multiplication by a scalar of matrices. • Solve problems involving 2x2 matrices. • Use matrices to solve simple problems in algebra 	Class work Homework Test
3	MATRICES	<ul style="list-style-type: none"> • Evaluate the determinant of a 2x2 matrix • Obtain the inverse of a non-singular 2x2 matrix. 	
4	MATRICES	<ul style="list-style-type: none"> • Solve a pair of linear simultaneous equations using matrices 	Class work Homework Test

LIST OF TEXT BOOKS

Mathematics for Caribbean Schools, Third Edition, Bk. 1; A. Foster, T. Tomlinson

Mathematics for Caribbean Schools, Third Edition, Bk. 2; A. Foster, T. Tomlinson

Mathematics for Caribbean Schools, Third Edition, Bk. 3; A. Foster, T. Tomlinson

Mathematics for Caribbean Schools, Third Edition, Bk. 4; A. Foster, T. Tomlinson

Nelson Caribbean Mathematics, Bk. 1 ; M. Folkes, M. Maxwell

Nelson Caribbean Mathematics, Bk. 2 ; M. Folkes, M. Maxwell

Nelson Caribbean Mathematics, Bk. 3 ; M. Folkes, M. Maxwell

Oxford Mathematics for the Caribbean, Fourth Edition; N. Goldberg, C. King,
C. Lutchman.

MATHEMATICS , A COMPLETE COURSE, WITH CXC QUESTIONS, Volumes 1 & 2;
Raymond Toolsie

CXC Basic Mathematics, A Revision Course, Second Edition; A. Greer, C.E. Layne

CXC Mathematics For Today, Volumes 1&2; G. Buckwell, R. Solomon,
T. Chung Harris