

Ministry of Education
Secondary Sector
Mathematics
Grade11
Christmas Term Schedule of Topics

Week	Topic	Sub-topic	Objectives	Content	Activities	Evaluation Strategy	Resources
1	Algebra	Equations in two variables	1. Solve a pair of equations in two variables when one equation is quadratic or non-linear and the other is linear. 2. Prove two algebraic expressions to be identical	Equations – one linear and the other quadratic Example: (i) $y = 10x + 16$ $y = x^2 + 7x - 24$ (ii) $y = -x^2 + 4x + 1$ $y = 3x - 1$ 2. Proving two algebraic expressions to be identical Example: Show that: (i) $y = -x^2 + 4x + 1$ and $y = 3x - 1$ is the same as $(x - 2)(x - 1) = 0$ (ii) $y = x^2 - 8x - 2$ and $y = x + 20$ is the same as $(x - 11)(x + 2) = 0$	Solve problems involving a pair of equations: one linear and the other quadratic Solution: 1. Write a single equation containing only one variable. $x^2 + 7x - 24 = 10x + 16$ $x^2 + 7x - 10x - 16 - 24 = 0$ $x^2 - 3x - 40 = 0$ 2. Solve by factoring. $x^2 - 3x - 40 = 0$ $(x - 8)(x + 5) = 0$ $x - 8 = 0 \Rightarrow x = 8$ or $x + 5 = 0 \Rightarrow x = -5$ 3. Find the corresponding y-values. Use either equation $y = 10(8) + 16 = 96$ $y = 10(-5) + 16 = -34$ 4. The solutions are (8, 96) and (-5, -34)	Worksheet Oral Written	Mathematics a Complete Course with CXC Questions Vol. 1
2		Quadratic Equations	Solving quadratic equations using the method of completion of Squares.	Completion of square method $x^2 + 9x = 136$ $x^2 + 9x + \left(\frac{9}{2}\right)^2 = 136 + \left(\frac{9}{2}\right)^2$ $\left(x + \frac{9}{2}\right)^2 = \frac{544}{4} + \frac{81}{4}$ $\left(x + \frac{9}{2}\right)^2 = \frac{625}{4}$ $\left(x + \frac{9}{2}\right) = \pm \sqrt{\frac{625}{4}}$ $x + \frac{9}{2} = \pm \frac{25}{2}$ $x + \frac{9}{2} = \frac{25}{2} \text{ or } x + \frac{9}{2} = -\frac{25}{2}$ $x = 8 \text{ or } x = -17$	Discussing the solutions to the equations using the completing the square method $\left(\frac{9}{2}\right)^2$ or $\frac{81}{4}$ to each side of the equation, i.e. add half the coefficient of x square. 2. Write $x^2 + 9x + \left(\frac{9}{2}\right)^2$ as a square 3. Rewrite 136 as a fraction with denominator 4. 4. Simplify the right side of the equation 5. Find the square root of each side	Oral Written Worksheet	Mathematics a Complete Course with CXC Questions Vol. 1

					6. Simplify 7. Write as two equations 8. Solve for x by subtracting $\frac{9}{2}$ from each side of the equations and simplifying		
3	Relations, Functions and Graphs	Quadratic Functions and graphs	1. Draw and interpret graphs of a quadratic function to determine: a). the elements of the domain that have a given image b). the image of a given element in the domain c). the maximum or minimum value of the function d). the equation of the axes of symmetry	Find the gradient of a curve at a point, tangent and turning point. Roots of the equation Maximum and minimum values Equation of the axes of symmetry	Finding gradient of a curve at a point, tangent and turning point Finding the roots of the quadratic function Finding the maximum and minimum values and the axis of symmetry	Worksheet Oral Written	Mathematics a Complete Course with CXC Questions Vol. 2 Past exam papers
4		Quadratic Functions and graphs	2. Draw and interpret graphs of a quadratic function to determine: e). the interval of the domain for which the elements of the range may be greater than or less than a given point. f). an estimate of the value of the gradient at a given point g). intercepts of a function	Graphs of quadratic functions Determine domain, range and gradient	Drawing and interpreting graphs of quadratic equations. Determining the domain, range, gradient and intercepts	Worksheet Oral Written	Mathematics a Complete Course with CXC Questions Vol. 2 Past exam papers
5		Quadratic functions Axes of symmetry Roots of functions	1. Determine the axis of symmetry, maximum or minimum value of a quadratic function expressed in the form $a(x + h)^2 + k$ 2. Expressed in the form $a(x + h)^2 + k$ and determine the roots. 3. Sketch graphs of quadratic functions	Review completion of square method Axis of symmetry Maximum and minimum values Use (completion of square) $a(x + h)^2 + k$ to determine the roots of the equations. Sketching quadratic graphs	Determining: 1. Axis of symmetry 2. Maximum and minimum values 3. Roots of equations	Worksheet Oral Written	Mathematics a Complete Course with CXC Questions Vol. 2 Past exam papers
6		Non-Linear functions	Draw and interpret the graphs of other non-linear functions	Non-linear functions: $y = ax^n$ where $n = -1, -2$ and $+3$	Drawing and interpreting graphs	Worksheet Oral Written	
7		Distance and Speed-time graphs	Draw and interpret distance-time graphs and speed-time graphs (straight line only) to determine: (a) distance (b) time (c) speed	Distance and speed-time graphs	Drawing and interpreting distance-time graphs and speed-time graphs	Worksheet Oral Written	Mathematics a Complete Course with CXC Questions Vol. 2 Past exam papers
8	Trigonometry	Elevation and Depression	1. Use trigonometric ratios and rules to solve problems in two and three dimensions	Heights and distances Angles of elevation and depression	Build and use models to identify angles and distances in two planes Using trigonometric ratios in the solution of right angled-triangles	Worksheet Oral Written	Mathematics a Complete Course with CXC Questions Vol. 2
9			2. Solve practical problems involving heights and distances in three dimensional situations	Bearings – practical problems: Angles of elevation and depression	.	Worksheet Oral Written	Mathematics a Complete Course with CXC Questions Vol. 2 Past exam papers
10	Geometry	Circle theorems	1. Solve geometric problems using properties of circles and circle theorems	1. The angle which an arc of a circle subtends at the centre of a circle is twice the angle it subtends at any point on the	Solving geometric problems using properties of circles and circle	Worksheet	Mathematics a Complete Course

				remaining part of the circumference 2. The angle in a semi-circle is a right angle 3. The angles in the same segment of a circle and subtended by the same arc are equal 4. The opposite angles of a cyclic quadrilateral are supplementary 5. The exterior angle of a cyclic quadrilateral is equal to the interior opposite angles	theorems	Oral Written	with CXC Questions Vol. 2 Past exam papers
11		Circle theorems	2. Solve geometric problems using properties of circles and circle theorems	6. A tangent of a circle is perpendicular to the radius of that circle at the point of contact 7. The lengths of two tangents from an external point to the points of contact on the circle are equal 8. The angle between a tangent to a circle and a chord through the point of contact is equal to the angle in the alternate segment 9. The line joining the centre of a circle to the mid-point of a chord is perpendicular to the chord	Solving geometric problems using properties of circles and circle theorems	Worksheet Oral Written	Mathematics a Complete Course with CXC Questions Vol. 2 Past exam papers
12	Sets	Intersection of three sets	1. Review problem solving involving intersection of three sets	Identifying regions for up to three sets Worded problems for intersection	Drawing and shading Venn Diagrams	Worksheet Oral Written	Mathematics a Complete Course with CXC Questions Vol. 2 Past exam papers
13	REVIEW Functions	6. Derive composite functions 7. Derive the inverse of a function f^{-1} , $(fg)^{-1}$ 8. State the relationship between a function and its inverse	1. Composite Function: fg , f^2 given f and g 2. Non-commutativity of composite functions ($fg \neq gf$)	Finding composite functions from given functions Investigating the commutativity of composite functions			
14	Inverse Functions	9. Evaluate functions 10. Use the relationship $(fg)^{-1} = g^{-1}f^{-1}$	1. $f(a)$, $f^{-1}(a)$, $fg(a)$, $(fg)^{-1}(a)$ where $a \in \mathbb{R}$. 2. Find the inverse of given functions: 3. Prove: $(fg)^{-1} = g^{-1}f^{-1}$	Evaluating functions Finding inverse functions Proving that the inverse of a composite function is the same as the product of the inverse of the individual function			
15			REVIEW AND DO REMEDIAL WORK ON TOPICS/CONCEPTS BASED ON WEAKNESSES AND NEEDS OF STUDENTS				

Note for all Teachers:

1. Use this termly schedule of topics, together with the Ministry of Education’s Curriculum Guides.
2. The recommended texts: Mathematics A Complete Course with CXC questions Volume 1 are not the only text you can use to give students practice exercises.
3. Use any Mathematics textbook that is available to you and the students.
4. Seek out the topics with the appropriate content for the students to gain practice.
5. If teachers feel that their students are competent in the objectives specified for the given week, then they can move on or give students additional work on the objectives to test their skills.

Ministry of Education
Secondary Sector
Mathematics
Grade11
Easter Term Schedule of Topics

Week	Topic	Sub-topic	Objectives	Content	Activities	Evaluation Strategy	Resources
1	Vectors and Matrices	Vectors	1. Explain the concepts associated with vectors 2. Combine vectors	1. Concept of vector, magnitude, direction, line segment, scalar 2. Triangular law or parallelogram laws, 2 x 1 column matrices e. g. $\begin{pmatrix} a \\ b \end{pmatrix} + \begin{pmatrix} c \\ d \end{pmatrix} = \begin{pmatrix} a + c \\ b + d \end{pmatrix}$ Vector algebra	Defining the term Vector Using the triangular law and parallelogram laws to solve problems	Worksheet Oral Written Past exam papers	Mathematics a Complete Course with CXC Questions Vol. 2
2		Position vector Magnitude of vectors Problem solving	3. Express a point P(a, b) as a position vector $\overrightarrow{OP} = \begin{pmatrix} a \\ b \end{pmatrix}$ where O is the origin (0, 0) 4. Determine the magnitude of a vector 5. Use vectors to solve problems in geometry	Displacement and position vectors Coordinates Unit vector Collinearity Parallel	Solving problems to identify position vector, parallel vectors, colinearity of vectors	Worksheet Oral Written Past exam papers	Mathematics a Complete Course with CXC Questions Vol. 2
3		Matrices Operations involving: Addition, subtraction, multiplication	6. Explain concepts associated with matrices 7. Perform addition, subtraction and multiplication of matrices; multiplication of matrices by a scalar	1. Concept of matrix, row, column, order, types of matrices, practical use 2. non-commutativity of matrix multiplication	Identifying row, column, order, types of matrices, practical use Adding , subtracting, and multiplying matrices	Worksheet Oral Written Past exam papers	Mathematics a Complete Course with CXC Questions Vol. 2
4		Matrices: Determinant Inverse Problem solving	8. Evaluate the determinant of a 2 x 2 matrix 9. Solve problems involving a 2 x 2 singular matrix 10. Obtain the inverse of a non-singular 2 x 2 matrix 11. Use matrices to solve simple problems in Arithmetic, Algebra and Geometry. Use of matrices to solve linear simultaneous equations. (Matrices of order greater than 3 x 3 will not be set).	Determinant and adjoint of a matrix Problem solving	Finding determinant, inverse Solving problems using matrix method	Worksheet Oral Written Past exam papers	Mathematics a Complete Course with CXC Questions Vol. 2
5	Transformation Geometry	Transformation matrix	1. Determine a 2 x 2 matrix associated with specified transformations 2. Determine a 2 x 2 matrix representation of the single transformation which is equivalent to the composition of two linear transformations in a plane (where the origin remains fixed)	Transformation matrix	Finding transformation matrices.	Worksheet Oral Written Past exam papers	Mathematics a Complete Course with CXC Questions Vol. 2

6	Relations, Functions & Graphs	Linear inequality Graphs	6. Draw a graph to represent a linear inequality in two variables 7. Use linear programming technique to solve problems involving two variables	Graphs of linear inequalities in two variables Use linear programming technique to solve problems involving two variables	Plotting and drawing graphs of linear inequalities Using linear programming technique to solve problems involving two variables	Worksheet Oral Written	Mathematics a Complete Course with CXC Questions Vol. 1
7	Patterns and Sequencies	Patterns and Sequences	Work non routine questions from past papers and texts.	Observe patterns and sequences to derive general expressions to describe same	Drawing and completing shapes and patterns and observing same	Worksheets	CSEC Papers Mathematics a Complete Course Vol. 2
8			Reteach and /or reinforce topics/concepts as observed from the needs of students or teachers’ diagnoses				
9							
10							
11							
12			EASTER TERM EXAMINATIONS				
13			EASTER TERM EXAMINATIONS AND REMEDIAL WORK ON WEAK AREAS IDENTIFIED FROM MATHEMATICS EXAMINATION				

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