

**Ministry of Education**  
**Secondary Sector**  
**Mathematics**  
**Grade 10**  
**Christmas Term Schedule of Topics**

Week	Topic	Sub-topic	Objectives	Content	Activities	Evaluation strategies	Resources
1	Measurement	Perimeter and Area  Circles	Calculating the perimeter and area of composite shapes Using trigonometric formulae to calculate area of a triangle and parallelogram Calculating the area of sector and segment Calculating the length of an arc	Combination triangles, rectangles with circles etc.  Area of $= \frac{1}{2} ab \sin C$  Formula for area of sector Area of segment = area of sector - area of Length of arc from circumference	Examining and manipulating shapes e.g. 4 quadrants to form a circle, etc. Comparing methods of finding area	Assignment Quiz Oral Project	Past CSEC Papers
2		Solids  Speed	Make models of prisms and pyramids using nets Use models to calculate surface area and volume  Solve problems involving time, distance and speed Convert units of speed	Properties of solids: cross-section, base, curved surface, etc. Curved surface area and total surface area and volume of cubes, cuboids, prisms, cylinders, pyramids, cone and sphere  $Speed = \frac{dis \tan ce}{time}$ Units: km/h; m/s; mph	Deriving formulae for areas Making and manipulating solids Examining solids to derive formulae for area and volume  Solving questions	Assignment Quiz Oral Project making models	Past CSEC Papers Mathematics a Complete Course with CXC Questions Vol 1
3		Margin of Error  Scale Drawings	Estimate the margin of error for given measurements Use maps and scale drawings to determine/calculate distances and areas	Sources of errors; max and min measurements  Using scales, e.g. 1:500, to determine actual distances, areas, etc.	Measuring length of objects; volume etc. Examining maps, plans, interpreting same	group assignment Test Quiz	Past CSEC Papers
4	Geometry	Construction	Construct lines, angles and hence polygons using rulers and compasses	30°, 45°, 60°, 90° and bisection of same and combinations; Polygons including triangles, quadrilaterals and others; regular and irregular	Constructing; measuring; bisecting and joining points, lines to form polygons	Project  Written assignment	Mathematics a Complete Course with CXC Questions Vol 1
5	Statistics	Interpret data and Categorise variables	1. Determine class features for a given set of data 2. Use four measurement scales-nomial, ordinal, interval and ratio to categorise types of variables 3. Interpret statistical diagrams	Class interval, class boundaries, class limits, class mid-points, class width Pie Charts, Bar Charts, Line Graphs, Histograms and Frequency Polygons	Identifying Class interval, class boundaries, class limits, class mid-points, class width Interpreting data from different graphs: Pie Charts, Bar Charts, Line Graphs, Histograms and Frequency Polygons	Worksheet Oral Written Past exam papers	Mathematics a Complete Course with CXC Questions Vol. 2
6		Grouped and ungrouped data	4. Determine the mean, median and mode for grouped and ungrouped data 5. Construct frequency table 6. Draw frequency polygon 7. Plot cumulative frequency curve	1. Mean, median and mode 2. Frequency table 3. Frequency polygon 4. Cumulative frequency curve	1. Finding the mean, median and mode for grouped and ungrouped data 2. Constructing frequency polygons and cumulative frequency curves 3. Interpreting the graphs	Worksheet  Oral  Written	Mathematics a Complete Course with CXC Questions Vol. 2 Past exam papers

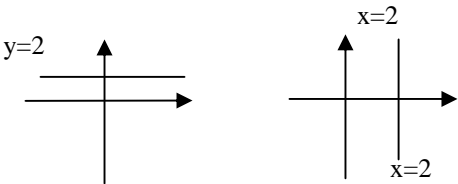
7		Measures of dispersion	8. Determine measures of dispersion for grouped and ungrouped data 9. Calculate and use Standard Deviation to compare data	Range, interquartile range and semi-interquartile range  Formula for Standard deviation and how it is used to compare data	Finding Range, interquartile range and semi-interquartile range Constructing cumulative frequency tables and curves	Oral Written Past exam papers	Mathematics a Complete Course with CXC Questions Vol. 2
8		Probability	10. Identify the sample space for sample experiments 11. Determine experimental and theoretical probabilities of events 12. Make inferences from statistics	Set of all possible outcomes Use of contingency tables  Raw data, tables diagrams	Solving problems based on probability	Worksheet Oral Written Past exam papers	Mathematics a Complete Course with CXC Questions Vol. 2
9	Algebra	Changing the subject  Variation	Changing the subject of the formula including roots and powers Representing direct and indirect variation symbolically Solving problems involving direct and inverse variation	Inverse operations to transpose Function machine to transpose Interpreting the meaning of variation; transforming variation symbol into equations i.e. If $A \propto r^2$ then $A = k \times r^2$	Reviewing basic operations and their inverse Building function machine Translating statements into variation expressions Investigating meaning of variation	Quiz  Oral  Written assignment	Mathematics a Complete Course with CXC Questions Vol 1
10		Indices    Expansion	Applying laws of indices to simplify and manipulate expressions with integrals and fractional indices   Expanding binomial expressions to obtain the difference of two squares, perfect squares, etc.	Laws of indices  $(x + a)(x - a) = x^2 - a^2$ $(x + a)(x + a) = x^2 + 2ax + a^2$ $(x + a)(x + b) = ax^2 + bx + c$	Deriving laws Multiplying and dividing expressions  Applying distributive law	Quiz  Oral  Written assignment	Mathematics a Complete Course with CXC Questions Vol 1
11		Factorization    Solving Equations	Factorizing expressions by: grouping; ABC/Factor method; difference of two squares; perfect squares; $ax^2 + bx + c$ where $a, b$ & $c$ are integers  Solving equations in one unknown involving expansion and algebraic fractions  Solving simultaneous linear equations in two unknown including word problems	Expressions (i) $ax + bx + ay + by$ (ii) $a^2 - b^2$ (iii) $x^2 + 2ax + a^2$ (iv) $ax^2 + bx + c$ where $a, b$ & $c$ are integers Solving: $5x + 3(x - 2) = 12$ * $3x + \frac{x}{4} = 10$ * $x + y = 5$ $x - y = 8$	Comparing expansion to factorization (reverse process) Factorising expressions  Applying transposition, distributive law	Assignment  Oral questioning	Mathematics a Complete Course with CXC Questions Vol 1
12		Quadratic Equations	Factorizing and solving quadratic equations Identifying roots of equations	Solving $ax^2 + bx + c = 0$ ; Relating roots to graphs of equations	Applying different methods to factorize	Written assignment  Project	Mathematics a Complete Course with CXC Questions Vol 1
13			Using quadratic formula to solve equations	<b>Quadratic Formula:</b> The solutions of some quadratic equations, $ax^2 + bx + c = 0$ ; $a \neq 0$ are not rational, and cannot be obtained by factoring. For such equations, the most common method of solution is the	Substituting in formula Using the quadratic formula to solve quadratic equations	Written assignment  Project	Mathematics a Complete Course with CXC Questions Vol 1

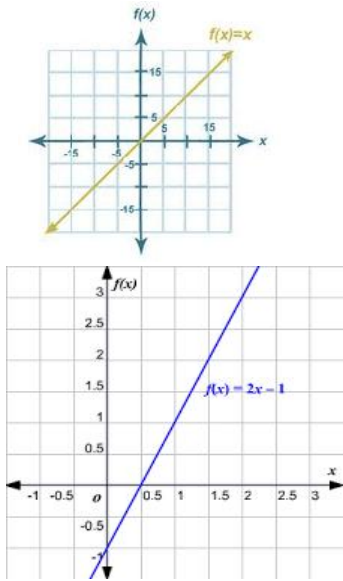
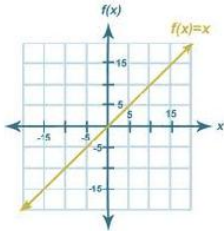
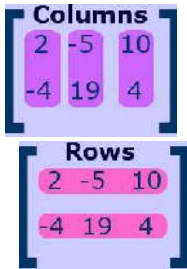
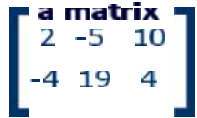
				quadratic formula. For $ax^2 + bx + c = 0$ , $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $\text{Solve: } x^2 + 2x - 8 = 0$ By Quadratic Formula: $a = 1, b = 2, c = -8$ $x^2 + 2x - 8 = 0$ $x = \frac{-2 \pm \sqrt{2^2 - 4(1)(-8)}}{2(1)}$ $= \frac{-2 \pm \sqrt{4 + 32}}{2} = \frac{-2 \pm \sqrt{36}}{2}$ $= \frac{-2 \pm 6}{2}$ $x = -4; \quad x = 2$			
14		Inequations	Solving linear inequations in one unknown  Solving worded problems	$3x + 5 \leq 12$  Translating worded problems into equations or inequations	Applying transposition and inequality concepts Listing values of x for solution Applying transposition and inequality concepts Listing values of x for solution	Quiz Oral Written assignment	Mathematics a Complete Course with CXC Questions Vol 1
15		REVIEW AND DO REMEDIAL WORK ON TOPICS/CONCEPTS BASED ON WEAKNESSES AND NEEDS OF STUDENTS					

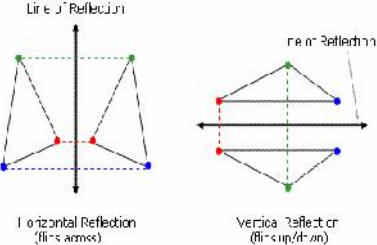
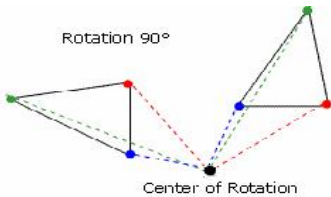
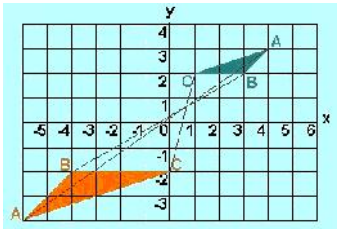
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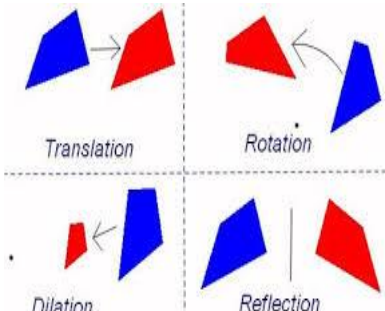
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**Ministry of Education**  
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**Mathematics**  
**Grade10**  
**Easter Term Schedule of Topics**

Week	Topic	Sub-topic	Objectives	Content	Activities	Evaluation Strategy	Resources
1	Consumer Arithmetic	Simple and Compound Interest Depreciation  Rates and Taxes Utilities	Use formulae to solve problems involving Simple and Compound Interest and Depreciation  Solve problems involving: i). Rates and Taxes ii). Utilities	Formulae for the three listed and substituting values to calculate same  Calculate: 1. rates and taxes 2. utility bills	Using calculators to compute answers  Calculating rates, taxes and utility bills	Oral Written Worksheet	Mathematics a Complete Course with CXC Questions Vol. 1
2		Invoices and shopping Salaries and wages Insurance and investments	Solving problems involving: iii). Invoices and shopping iv). Salaries and wages v). Insurance and investments	Problems involving: 1. Invoices and shopping 2. Salaries and wages 3. Insurance and investments	Solving problems involving: 1. Invoices and shopping 2. Salaries and wages 3. Insurance and investments	Oral Written Worksheet	Mathematics a Complete Course with CXC Questions Vol. 1
3	Trigonometry	Trigonometric Rules	1. Use sine and cosine rules in the solution of problems involving triangles	Sine and cosine rules	Using sine and cosine rules in the solution of problems involving triangles	Oral Written Worksheet	Mathematics a Complete Course Vol. 1
4		Elevation and Depression	1. Use trigonometric ratios and rules to solve problems in two dimensions	Heights and distances Angles of elevation and depression	Using trigonometric ratios in the solution of right angled-triangles	Worksheet Oral Written	Mathematics a Complete Course with CXC Questions Vol. 2
5		Bearings	2. Represent the relative position of two points given the bearing of one point with respect to the other 3. Determine the bearing of one point relative to another point given the position of the points 4. Solve problems involving bearings	Bearings – relative position of two points  Bearings – one point relative to another given the position of the points	Sketching diagrams to show relative positions Sketching diagrams to show relative positions on Bearings. Sketching diagrams to show relative positions and solving problems based on Bearings	Worksheet  Oral  Written	Mathematics a Complete Course with CXC Questions Vol. 2  Past exam papers
6	Relations, Functions and Graphs	Linear Functions	1. Draw and interpret graphs of Linear Functions 2. Determine the intercepts of the graph of Linear functions 3. Determine the gradient of a straight line	1. Concept of Linear Function 2. Types of Linear Function: $y = c$ ; $x = k$ ; $y = mx + c$ ; where $m$ , $c$ and $k$ are real numbers 3. The x-intercepts and y-intercepts graphically and algebraically. 4. Concept of slope  	A linear function is a mathematical <a href="#">equation</a> in which no independent-variable is raised to a <a href="#">power</a> greater than one. A simple <a href="#">linear</a> function with only one <a href="#">independent variable</a> ( $y = mx + c$ ) traces a straight line when plotted on a <a href="#">graph</a> . Also called linear equation. The linear function can be written as: $f(x) = y = mx + c$ . In the above equation, "m" is called the slope of the line and	Oral  Written  Worksheet	Mathematics a Complete Course with CXC Questions Vol. 1

					<p>"c" is called the intercept on y-axis.</p> 		
7		Non Linear Functions	4. Construct graphs of quadratic functions of the form $y = ax^2$ and $y = ax^2 + bx + c$ 5. Investigate properties of same 6. Calculate the gradient at a point on the curve	Concave and Convex curves Maximum and minimum curves Gradient a tangent at a point on the curve	1. Drawing graphs to show the x-intercepts and y-intercepts. 2. Find the slope or gradient of a line graphically.	Oral  Written  Worksheet	Mathematics a Complete Course with CXC Questions Vol. 1
8	Introduction to Matrices	Matrices	1. Definition of matrix 2. Identify Column Matrix and Row Matrix 3. Order and inverse of a matrix 4. Addition and Subtraction of matrices   5. Multiplication of matrices	1. Column matrix notation $\begin{pmatrix} x \\ y \end{pmatrix}$ or $\begin{bmatrix} x \\ y \end{bmatrix}$ 2. Row matrix notation $(x, y)$ or $[x, y]$ 3. Addition: For example: $A + B =$ $\begin{bmatrix} 1 & 3 \\ 1 & 0 \\ 1 & 2 \end{bmatrix} + \begin{bmatrix} 0 & 0 \\ 7 & 5 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} 1+0 & 3+0 \\ 1+7 & 0+5 \\ 1+2 & 2+1 \end{bmatrix} = \begin{bmatrix} 1 & 3 \\ 8 & 5 \\ 3 & 3 \end{bmatrix}$ 4. Subtraction: For example: $A - B =$ $\begin{bmatrix} 1 & 3 \\ 1 & 0 \\ 1 & 2 \end{bmatrix} - \begin{bmatrix} 0 & 0 \\ 7 & 5 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} 1-0 & 3-0 \\ 1-7 & 0-5 \\ 1-2 & 2-1 \end{bmatrix} = \begin{bmatrix} 1 & 3 \\ -6 & -5 \\ -1 & 1 \end{bmatrix}$	A matrix is a way to organize data in columns and rows. A matrix is written inside brackets [ ]. Each item in a matrix is called an entry. The matrix below has two rows and three columns.   (i) Its dimensions are $2 \times 3$ (order) (ii) 2 rows and 3 columns (iii) The entries of this matrix below are 2, -5, 10, -4, 19, 4.	Oral  Written  Worksheet	Mathematics a Complete Course with CXC Questions Vol. 1
9	Transformation Geometry	Translation And Reflection	1. Representing translation in the plane using vectors 2. Determine and represent the location of: a) the image of an object	In <a href="#">mathematics</a> , a <b>transformation</b> could be any <a href="#">function</a> mapping a <a href="#">set</a> X on to another set or onto itself. However, often the set X has some additional <a href="#">algebraic</a> or <a href="#">geometric</a> structure and the term "transformation" refers to a function	Defining the term symmetry. Examining the types of symmetry.	Oral  Written	Mathematics a Complete Course with CXC Questions Vol. 1

			<p>b) object for given image</p> <p>3. Reflect points and plane figures in the axes and given lines using vectors</p> <p>4. Determine and represent the location of:</p> <p>a) the image of an object</p> <p>b) object for given image</p> <p>5. Use vectors to reflect points and shapes</p>	<p>from X to itself that <a href="#">preserves this structure</a>.  A <b>translation</b>, or <b>translation operator</b>, is an <a href="#">affine transformation</a> of <a href="#">Euclidean space</a> which moves every point by a fixed distance in the same direction.  It can also be interpreted as the addition of a constant <a href="#">vector</a> to every point, or as shifting the <a href="#">origin</a> of the <a href="#">coordinate system</a>.  In other words, if <math>\mathbf{v}</math> is a fixed vector, then the translation <math>T_{\mathbf{v}}</math> will work as <math>T_{\mathbf{v}}(\mathbf{p}) = \mathbf{p} + \mathbf{v}</math></p> <p>1. A translation in given lines and stated plane</p> <p>2. A reflection in a line and plane  Reflection is considered to be an <i>opposite</i> motion since it changes the <a href="#">orientation</a> of the figures it reflects.</p> 	<p>Translating points and plane figures in given lines and planes</p> <p>Reflecting points and plane figures in given lines and planes</p> <p><b>Flip (Reflection):</b>A FLIP takes place when a shape is flipped across a line and faces the opposite direction. Because the shape ends up facing the opposite direction, it appears to be reflected, as in a mirror. Hence the name REFLECTION.</p>	Worksheet	
10		Rotation	<p>1. Rotate points and shapes about the origin and given points by construction</p> <p>2. Rotate points and shapes about the origin and given points by finding the image and plotting same</p>	<p>3. A rotation about a point (the centre of rotation) in that plane  A ROTATION takes place when shape is turned clockwise or anti-clockwise about a fixed point called the centre of rotation. After any of those transformations (flip, slide or turn), the shape still has the same size, area, angles and line lengths.</p> 	<p>A rotation is a transformation that is performed by "spinning" the object around a fixed point known as the centre of rotation. You can rotate your object at any degree measure, but 90° and 180° are two of the most common. Also, rotations are done counterclockwise (Anticlockwise).</p>	<p>Oral</p> <p>Written</p> <p>Worksheet</p>	Mathematics a Complete Course with CXC Questions Vol. 1
11		Enlargement	<p>1. Enlarge and reduce shapes about a centre using a scale factor</p> <p>2. Determine the scale factor given object and image, etc.</p> <p>3. Identifying the relationship between an object and its image in the plane after a geometric transformation</p> <p>4. Describing a transformation given an object and its image</p>	<p>5. An enlargement or reduction in that plane</p>  <p>1. Similarity and congruency</p>	<p>Uniform scaling is a <a href="#">linear transformation</a> that enlarges or diminishes objects; the <a href="#">scale factor</a> is the same in all directions. The result of uniform scaling is <a href="#">similar</a> (in the geometric sense) to the original.</p>		

				 <p>The word <b>'transform'</b> means "to change." In geometry, a transformation changes the position of a shape on a coordinate plane.</p>			
12			EASTER TERM EXAMINATIONS				
13			EASTER TERM EXAMINATIONS AND REMEDIAL WORK ON WEAK AREAS IDENTIFIED FROM MATHEMATICS EXAMINATION				

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**Ministry of Education**  
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**Grade 10**  
**August Term Schedule of Topics**

Week	Topic	Sub-topic	Objectives	Content	Activities	Evaluation Strategy	Resources
1	Transformation Geometry	Combination of Transformation Geometry	1. Locate the image of a set of points under a combination of transformations 2. State the relations between an object and its image as the result of a combination of two transformations	1. Combination of any two: enlargement/reduction, translation, rotation, reflection, glide reflection	Locating the image of a set of points under a combination of transformations  Stating the relationship between an object and its image as a result of a combination of two transformations	Worksheet  Oral  Written	Mathematics a Complete Course with CXC Questions Vol. 1
2	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 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	Solving geometric problems using properties of circles and circle theorems	Worksheet  Oral  Written	Mathematics a Complete Course with CXC Questions Vol. 1
3		Circle Theorems Cont'd	1. Solve geometric problems using properties of circles and tangents theorems	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 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	Solving geometric problems using properties of circles and circle theorems	Worksheet  Oral  Written	Mathematics a Complete Course with CXC Questions Vol. 1
4	Algebra	Algebraic Fractions	Simplifying algebraic fractions using the four basic operations Simplifying algebraic fractions by factorizing and finding LCD	Add, subtract, multiply and divide algebraic fractions  Factorizing difference of 2 squares, etc. Finding common factors of terms	Finding HCF and LCD of algebraic terms; reducing fractions Factorising and simplifying	Quiz Oral Written assignment	Mathematics a Complete Course with CXC Questions Vol 2
5		Completing the Square	1. Express quadratic expressions in the form of $a(x + h)^2 + k$ using various methods	Complete the square by forming a perfect square expression and also using formula for h and k	Rewriting quadratic expressions and investigate properties for h and k	Worksheet  Oral Written	Mathematics a Complete Course with CXC Questions Vol. 2
6	Relations, Functions and Graphs	Linear Graphs	1. Determine from coordinates on a line segment: a). the length b). the coordinates of the mid-point c). calculate the gradient of a line	Given coordinates of lines or graphs of linear equations: 1. Find the magnitude or length 2. Find the coordinates of the mid-point of lines 3. Calculating the gradient of a line	Finding: 1. Magnitude of lines 2. Coordinates of mid-point of lines	Worksheet Oral Written	Mathematics a Complete Course with CXC Questions



					3. Gradient of a line		Vol. 1
7		Functions and Graphs	2. Determine the equation of a straight line 3. Solve problems involving the gradient of parallel and perpendicular lines	1. Graph of the line – writing the equation of a line from the given graph 2. Using the coordinates of two points on the line to write an equation 3. Using the gradient and one point on the line to write an equation 4. Using one point on the line and its relationship to another line to write an equation 5. Finding gradient of parallel and perpendicular lines	1. Draw the graph of linear equations 2. write the equation of a line from a given graph 3. Use: (i) the coordinates of two points on the line to write an equation (ii) the gradient and one point on the line to write an equation (iii) one point on the line and its relationship to another line to write an equation 4. Find gradient of parallel and perpendicular lines	Worksheet  Oral  Written	Mathematics a Complete Course with CXC Questions Vol. 1
8		Linear Graphs	4. Solve graphically a system of two linear equations in two variables 5. Represent the solution of linear inequalities in one variable using: a) set notation b) the number line c) graph	Graph of simultaneous equations: 1. Find the solution sets Linear Inequalities: 1. Write the solution using set notation 2. Use of number line to show the solution set 3. Graph the inequations	Plotting and drawing graphs of simultaneous equations to find the solution sets. Write the solution set using set notation and number lines for linear inequalities	Worksheet  Oral  Written	Mathematics a Complete Course with CXC Questions Vol. 1
9		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	Worksheet  Oral  Written	Mathematics a Complete Course with CXC Questions Vol. 1
		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 $a \in R$ . 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	Worksheet  Oral  Written	Mathematics a Complete Course with CXC Questions Vol. 1
10			ANNUAL EXAMINATIONS				
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