

# **COURSE OUTLINE: CSEC**

## **MATHEMATICS**

### **Assessment Weighting:**

**Classwork: 25%**

**Tests: 15%**

**Exam: 45%**

**Attendance: 5% (absent for 50% of classes = 0%)**

**Punctuality: 5% (late for more than 50% of classes = 0%)**

**Participation: 5% (participate in less than 50% of classes = 0%)**

**Unit topic: Number Theory and Computation.**

### **General Objectives:**

On completion of this Section, students should:

1. Demonstrate computational skills.
2. Be aware of accuracy in computation.
3. Appreciate the need for numeracy in everyday life.
4. Demonstrate the ability to make estimates fit for purposes.

5. Understand and appreciate the decimal numeration system.
6. Appreciate the development of the different numeration systems.
7. Demonstrate the ability to use real rational approximation of real numbers.
8. Demonstrate the ability to use number properties to solve problems.
9. Develop the ability to use patterns, Trends and investigative skills.

## **Learning Outcomes:**

Upon completion of this section students should be able to:

1. Identify the different sets of numbers.
2. List elements of the different sets of numbers.
3. Compute squares, square roots, and cube roots of numbers.
4. Perform the four basic operations on numbers.
5. Solve complex questions using the order of operations.
6. Convert fractions to decimals and percentages.
7. Convert decimals to fractions and percentages.
8. Convert percentages to decimals and fractions.
9. List the negative and positive factors of an integer.
10. Compute highest common factors and lowest common multiple of integers.
11. Compute the place value of numbers in base 2, base 4, base 8 and base 10.
12. Convert numbers within the metric scale, 12-hour and 24-hour clock.
13. Expressive values off numbers to 1, 2 or 3 significant figures.

14. Express values of numbers to 0, 1, 2 or 3 significant figures.
15. Use properties of operations such as closure, associativity, additive and multiplicative identity and inverses, commutativity and the distributive property in computational tasks.
16. Expressing numbers using scientific notation.
17. Determine the whole given the fraction or percentage.
18. Compare quantities using ratio, proportion and rates.
19. Rearrange real numbers in ascending or descending order.

## Course Details

<b>Date</b>	<b>Topics</b>	<b>Specific Objectives</b>	<b>1. Assignments</b>	<b>Resources</b>
Week 1-3 Oct (15×40 mins)	Number theory and Computation.	<ol style="list-style-type: none"> <li>1. Distinguish among sets of numbers.</li> <li>2. Compute powers of real numbers of the form <math>x^a</math>, where <math>a \in \mathbb{Q}</math>.</li> <li>3. Evaluate numerical expressions using any of the four basic operations on real numbers.</li> <li>4. Convert among fractions, percents and decimals.</li> <li>5. List the set of factors and multiples of a given integer.</li> <li>6. Compute the HCF or LCM of two or more positive integers.</li> <li>7. State the value of a digit of a numeral in a given base.</li> <li>8. Convert from one set of units to another.</li> </ol>	<ul style="list-style-type: none"> <li>● Students will participate in a game quiz known as what's in a number. Students will randomly select a number from a bag and they will have 10 seconds to share three facts about that number.</li> <li>● Worksheets and quizzes.</li> <li>● Create conversion tables for the</li> </ul>	

		<p>9. Express a value to a given number of significant figures and decimal places.</p> <p>10. Use properties of numbers and operations in computational tasks.</p> <p>11. Write an irrational number in scientific notation.</p> <p>12. Calculate any fraction or percentage of a given quantity.</p> <p>13. Express one quantity as a fraction or percentage of another.</p> <p>14. Compare quantities.</p> <p>15. Order a set of real numbers.</p> <p>16. Compute terms of a sequence given a rule.</p> <p>17. Derive an appropriate rule given the terms of a sequence.</p> <p>18. Divide a quantity in a given ratio.</p> <p>19. Solve problems involving Concepts in number Theory and computation.</p>	<p>different number bases.</p> <ul style="list-style-type: none"> <li>• Solve complex problems involving the number Theory and computation.</li> </ul>	
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## Unit topic: Transposing Formulae

### General Objectives:

On completion of this Section, students should:

1. Understand the relationship between the basic operations of numbers.
2. Appreciate the rules that govern mathematical operations.

### Learning Outcomes:

Upon completion of this section students should be able to:

1. Rewrite formulae to change the subject.

## Course Details

<b>Date</b>	<b>Topics</b>	<b>Specific Objectives</b>	<b>Assignments</b>	<b>Resources</b>
Week 4 October (5×40 mins)	Transposing Formulae	<ol style="list-style-type: none"><li>1. Identify opposite operations.</li><li>2. Change the subject of a given formula.</li></ol>	<ul style="list-style-type: none"><li>• Transposition relay. Teams of students will be formed, each member will perform a step in the transposing of a formula.</li><li>• Complete worksheet on transposing formulae from simple to complex.</li></ul>	

## Unit topic: Algebra

### **General Objectives:**

On completion of this Section, students should:

1. Appreciate the use of algebra as a language and a form of communication.
2. Appreciate the role of symbols and algebraic techniques in solving problems in mathematics and related fields.

3. Demonstrate the ability to reason with abstract entities.

## **Learning Outcomes:**

Upon completion of this section students should be able to:

1. Represent numbers, operations, variables and relations using symbols.
2. Convert word expressions into algebraic expressions.
3. Perform arithmetic operations involving directed numbers.
4. Group like terms in an algebraic expression.
5. Simplify algebraic expressions.
6. Evaluate algebraic expression involving commutative, associative and distributive properties.
7. Apply the distributive law in factorising or expanding algebraic expressions.
8. Perform the four basic operations on algebraic fractions.
9. Solve equations one variable.
10. Solve simultaneous equations with two variables.
11. Factorize algebraic expressions.
12. Complete the square of a quadratic expression.
13. Solve quadratic equations by methods of factorization and completing the square.
14. Solve linear equations and linear inequalities.
15. Solve equations where one equation is non-linear and the other is linear. Prove that two given expressions are identical.
16. Write statements representing direct and inverse variation between variables.

17. Solve problems involving direct and inverse variation between variables.

## Course Details

Date	Topics	Specific Objectives	Assignments	Resources
Week 5-9 Nov-Dec c (25×40 mins)	Algebra	<ol style="list-style-type: none"> <li>1. Use symbols to represent numbers, operations, variables and relations.</li> <li>2. Translate between algebraic symbols and worded expressions.</li> <li>3. Evaluate arithmetic operations involving directed numbers.</li> <li>4. Simplify expressions using the four basic operations.</li> <li>5. Substitute numbers for variables in algebraic expressions.</li> <li>6. Evaluate expressions involving binary operations other than the four basic operations.</li> <li>7. Apply the distributive law to factorize or expand algebraic expressions.</li> <li>8. Simplify algebraic fractions.</li> <li>9. Use the laws of indices to manipulate expressions with integral indices.</li> <li>10. Solve linear equations in one unknown.</li> <li>11. Solve simultaneous linear equations in two unknowns, algebraically.</li> </ol>	<ul style="list-style-type: none"> <li>● Converting worded expression or equations to algebraic expressions or equations.</li> <li>● Determine the simultaneous equations that govern two stoplight at a specific area.</li> <li>● Solve real life dilemmas of businesses of time using algebra.</li> <li>● Worksheets and quizzes</li> </ul>	

		<p>12. Solve a simple linear inequality in one unknown.</p> <p>13. Factorize algebraic expressions.</p> <p>14. Rewrite a quadratic expression in the form <math>a(x + h)^2 + k</math>.</p> <p>15. Solve quadratic equations algebraically.</p> <p>16. Solve word problems.</p> <p>17. Solve a pair of equations in two variables when one equation is quadratic or non-linear and the other is linear.</p> <p>18. Prove to algebraic expressions to be identical.</p> <p>19. Represent direct and inverse variation symbolically.</p> <p>20. Solve problems involving direct variation and inverse variation.</p>		
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## Unit topic: Consumer Arithmetic

### General Objectives:

On completion of this Section, students should:

1. Develop the ability to perform the calculations required in the normal business transactions and in computing their own budgets.
2. Appreciate the need for both accuracy and speed in calculations.

3. Appreciate the advantages and disadvantages of different ways of investing money.
4. Appreciate that business arithmetic is indispensable in everyday life.
5. Demonstrate the ability to use concepts in consumer arithmetic to describe model and solve real-world problems.

## **Learning Outcomes:**

Upon completion of this section students should be able to:

1. Calculate discount, sales tax, profits and loss.
2. Calculate percentage profit and percentage loss.
3. Express a profit, loss, discount, markup and purchase tax as a percentage of a given value.
4. Calculate setting price, sale price, cost price, profit, loss or discount.
5. Perform calculations involving hire purchase and mortgages.
6. Modify the formula for simple interest to calculate principal, time, rate and simple interest.
7. Perform calculations involving the computation of compound interest. Convert between currencies.
8. Perform calculations involving rates, taxes, utilities, invoices, shopping bills, salaries and wages and insurance and Investments.

## **Course Details**

Date	Topics	Specific Objectives	1. Assignments	Resources
Week 10-12 Dec-Jan (15×40 mins)	Consumer Arithmetic	<ol style="list-style-type: none"> <li>1. Calculate discount, sales tax, profit-and-loss.</li> <li>2. Calculate percentage profit and percentage loss.</li> <li>3. Express a profit, loss, discount, markup and purchase tax as a percentage of a given value.</li> <li>4. Solve problems involving marked price, selling price, cost price, profit, loss or discount.</li> <li>5. Solve problems involving payment by installments as in the case of hire-purchase and mortgages.</li> <li>6. Solve problems involving simple interest.</li> <li>7. Solve problems involving compound interest.</li> <li>8. Solve problems involving appreciation and depreciation.</li> <li>9. Solve problems involving measures and money.</li> <li>10. Solve problems involving rates and taxes, utilities, invoices and the shopping bills, salaries and wages, insurance and investment.</li> </ol>	<ul style="list-style-type: none"> <li>● 'To do or not to do'. (Students will each select three different products currently on sale or hire purchase, whether online or anywhere, they will prepare a report on the product, complete with calculations. Based on their findings they will advise the costumer, from a financial standpoint, whether or not it is good to purchase.</li> <li>● Worksheets and quizzes.</li> </ul>	