CCSLC®
Mathematics

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN CERTIFICATE OF SECONDARY LEVEL COMPETENCE®

MATHEMATICS SYLLABUS

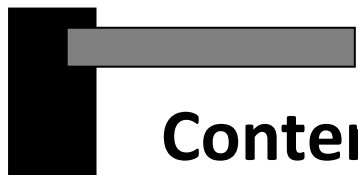**Effective for examinations from May–June 2012**

This document CCSLC/M/03/2010 replaces NSP/M03/2006 issued in 2006.

Please note that the syllabus was revised and amendments are indicated by italics.

First Issued 2006
Amended 2012

Please check the website, www.cxc.org for updates on CXC's syllabuses.

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Caribbean Certificate of Secondary Level Competence

INTRODUCTION

The Caribbean Examinations Council (CXC) in consultation with policy makers and educators in CXC Participating Territories identified the need for a new programme that *would* respond to the changing demands of the education sector. A major development *has been* the move by all territories to universal secondary education *which* enables persons with a wide range of abilities to benefit from educational provision at this level. The decision to implement programmes to achieve universal secondary education is based on an understanding that the region needs a well educated and trained labour force for an increasingly competitive global environment. A sound secondary education foundation is imperative for further education and training *and for entry in the world of work*.

Several territories, *having* recognised the need for a programme that *would* meet the new needs in secondary education, had embarked on the development of national programmes. However, through consultations at the regional level, policy makers and educators recognised that a regional intervention by CXC *would* have several benefits including cost-effectiveness, *common standards*, portability of certification and regional and international recognition.

CXC has responded. Through the consultative processes employed in syllabus development, *CCSLC was developed* and first examined in 2007. The programme which is competency-based comprises a core of subjects – English, Integrated Science, Mathematics, Modern Languages and Social Studies. Through this core, the learner should acquire the knowledge, skills, competencies, values and attitudes that are desired in a secondary school leaver. The core developed by CXC subject panels will be examined by CXC. In addition, learners can gain additional benefit through special programmes that may be added as electives to the core at national level.

Policy makers and educators have noted that, ideally, this core programme could be taken by all students at the stage when they are ready. However, the decision on who should take the examination and in what year it will be taken will be *made* at national level in consultation with CXC. A person who successfully completes this core should have the foundation for further education and training and for entry level employment. In developing and implementing this programme at the secondary level, CXC, working with its partners, took into consideration the cultural context and the aspirations of regional governments for a well educated and trained labour force to meet the targets set for social and economic development *as enshrined in the CARICOM document "The Ideal Caribbean Person (2000)"*. *The foundation that* this programme will provide is an imperative as a base for the development of citizens as the most valuable resource of the small states of the region.

The main focus of this programme is derived from the aspirations of regional governments and the Caribbean Community (CARICOM) which acknowledge that education is the route to healthy democracies and sustainable development. The curriculum is therefore competency based and encompasses the knowledge, skills, attitudes, values and attributes expected of high school graduates by regional Governments. Some of these knowledge, skills, attitudes, values and attributes or competencies are generic and cut across all five subjects, whilst others are peculiar to each of the five subjects of the curriculum. The generic and subject specific competencies targeted for development in the curriculum are given below.

GENERIC COMPETENCIES

- PROBLEM SOLVING

- CRITICAL THINKING

- INFORMED DECISION MAKING

- MANAGEMENT OF EMOTIONS

- POSITIVE SELF CONCEPT

- WORKING IN GROUPS

- HANDLING CONFLICT

- DEALING WITH DIVERSITY AND CHANGE

- INDEPENDENT LEARNING STRATEGIES

- COMPUTER LITERACY

- TECHNOLOGICAL LITERACY

SUBJECT-SPECIFIC COMPETENCIES

- ABILITY TO COMMUNICATE ORALLY AND IN WRITING

- ABILITY TO FUNCTION IN A FOREIGN LANGUAGE

- MATHEMATICAL LITERACY

- SCIENTIFIC LITERACY

- SOCIAL AND CITIZENSHIP SKILLS

COMPETENCIES

The structure of the programme takes into consideration that the attainment of the competencies identified is the result of processes that require life-long learning and that mastery is attained by progressive steps over differing periods of time. Bearing in mind that one of the main purposes of the curriculum is to prepare individuals to participate fully as productive members of society, key competencies have been identified that are essential for daily living with emphasis on the workplace. A Learning Grid (Appendix I) lists the key competencies across the five subjects of the curriculum, identifies a reference number and indicates the subjects or group of subjects that specifically engage the learner in its development.

OUTCOMES OF THE CURRICULUM

The curriculum hinges on the realization that teaching and learning are essential instruments for the development of autonomous individuals who will be able to function effectively as productive members of society. In this regard, the curriculum has identified knowledge, skills, attitudes, values and attributes or competencies that students who master the programme should have attained. These include:

- a positive image of self, family, community, region and world;

- respect for others irrespective of age, class, creed, gender, ethnicity, physical disabilities or nationality;

- an abhorrence of violence in all its forms and commitment to settle disputes through arbitration and conciliation;

- the capacity to understand that individual freedom is consonant with the acceptance of personal responsibility for one's own actions;

- commitment to ethical and moral societies that recognize equality of opportunity, freedom of expression and association, and the right to fair judicial process.

Main Elements of the Curriculum

- *It identifies the foundation for knowledge, skills and attitudes required for secondary education.*

- It provides the foundation for further education and training and for entry level employment.

- It provides articulation between and within subject groups offered in the Caribbean Secondary Education Certificate (CSEC) examination by catering for students who continue at secondary school to take General Proficiency examinations in academic or technical and vocational or a mix of academic and technical and vocational subjects.

- It facilitates articulation within the wider school curriculum and responds to the developmental needs of the region.

MATHEMATICS SYLLABUS

♦ RATIONALE

Mathematics is a precise and concise means of communicating patterns, relationships, ideas and values in a quest for a deeper and better understanding of the world around us. It requires observation, representation, investigation and comparison of patterns in social and physical phenomena.

Mathematics in the Caribbean responds to the broad spectrum of needs of the Caribbean community. *Caribbean people need to be mathematically literate as this will enable them to identify and understand the role that mathematics plays in the world, make sound judgements, and engage in mathematical thinking that meets the needs of their current and future life as constructive, concerned and reflective citizens. The Mathematics programme of study is, therefore, designed to help Caribbean students to develop mathematical literate competencies such as thinking and reasoning; mathematical communication; argumentation; modelling; problem posing and solving; representation; the use of symbols, tools and technology. On completion of this course of study*, students will be equipped to use mathematics for the enhancement of their environment, as well as for the empowerment of self, country and region, in order to be more competitive in an ever-changing world environment.

The Mathematics programme generally recognizes that Mathematics teaching and learning may be enriched by approaching content and teaching and learning activities through the use of concrete examples and experiences, as well as, through real-life experiences. If implemented as suggested, the programme would equip all Caribbean students for the world of work or further study, and in general, for life-long learning.

This course of study will contribute to the development of the Ideal Caribbean Person as articulated by the CARICOM Heads of Government who has respect for human life and is aware of the importance of living in harmony with the environment; demonstrates multiple literacies, independent and critical thinking and the innovative application of science and technology to problem solving. Based on the UNESCO Pillars of Learning, on completion of this syllabus, students will learn to do, learn to be and learn to transform themselves and society.

♦ AIMS

The study of Mathematics is intended to assist students to:

1. develop an appreciation of mathematics and its continued contribution to modern life;

2. develop critical thinking skills and spatial awareness;

3. develop skills to analyse and solve problems arising out of real-life situations;

4. develop investigative and problem solving skills;

5. develop the *skill to communicate mathematical thinking in meaningful ways;*

6. develop the skills to use appropriate technology to solve mathematical problems

◆ GENERAL OBJECTIVES

On completion of the Mathematics programme of study, students should:

1. *develop competence in working with numbers;*

2. develop skills to use appropriate mental, written and calculator techniques to solve a variety of problems;

3. develop algebraic thinking skills;

4. appreciate that transactions with money are integral to everyday life;

5. develop an appreciation of the value of money, locally and internationally;

6. understand the need for accuracy and honesty in dealing with money;

7. develop and apply geometric properties of straight lines, polygons and circles;

8. develop spatial awareness;

9. develop computational and estimation competencies;

10. develop skills in collecting, summarising and interpreting data in different ways;

11. develop the ability to use data to solve problems, make decisions, and draw conclusions and inferences;

12. develop skills to use statistics and set theory as problem solving tools.

◆ COMPETENCIES TO BE ASSESSED

The Aims and General Objectives can be attained by developing *in the student the competencies listed below:*

1. ***Mathematical Thinking and Reasoning (TR):*** *Posing questions characteristic of mathematics ("Is there….?, How do I find….?); knowing the kind of answer that mathematics offer to such questions; distinguishing between different kinds of statements (definitions, theorems, examples); and understanding and handling the extent and limits of given mathematical concepts.*

2. ***Mathematical Argumentation (A):*** *Knowing what proofs are and how they differ from other kinds of mathematical reasoning; following and assessing chains of mathematical arguments; possessing a feel for heuristics ('what can or cannot happen, and why?); and creating and expressing mathematical arguments.*

3. ***Mathematical Communication (C):*** *Expressing oneself in a variety of ways in oral, written and other visual form; understanding someone else's work.*

4. ***Modelling (M):*** *Structuring the field or situation to be modeled; translating reality into mathematical structures; interpreting mathematical models in terms to reality; working with a mathematical model; validating the model; reflecting, analyzing and critiquing a model and its result; and monitoring and controlling the modeling process.*

5. ***Problem Posing and Solving (PPS):*** *Posing, formulating and defining different kinds of mathematical problems and solving different kinds of problems in a variety of ways.*

6. ***Representation (R):*** *Decoding, encoding, translating, distinguishing between, and interpreting different forms of representation of mathematical objects and situations; the interrelationships between the various representations; choosing and switching between different forms of representation, according to situation and purpose.*

7. ***Symbols (S):*** *Decoding and interpreting symbolic, formal and technical language and operations.*

8. ***Tools and Technology (TT):*** *Using aids and tools, including technology when appropriate.*

♦ **ORGANIZATION OF THE SYLLABUS**

Module 1   -   Number and Number Sense

Module 2   -   Conscious Consumer

Module 3   -   Spaces in the Environment

Module 4   -   Measuring around us

Module 5   -   Data Handling

♦ **NOTE TO TEACHERS**

Throughout the Modules, topics of interest and importance are suggested for exploration. Teachers may want to use other Suggested Teacher and Learning Activities to teach the relevant areas. Teacher could ask individual students or groups of students to carry out one or two of these activities and then share their findings with the rest of the class. *Teachers should provide situation where students can through problem solving, investigation and projects, draw conclusion, make inferences and form generalisation, based on their findings.* Reports generated from the activities along with other pieces of work may be used for assessment. Students should be encouraged to include brief comments on their work and experiences. Where possible, teachers and students are encouraged to use available technology to enhance the learning and teaching experiences. *Teachers should ensure that at least one competence (see page 2) is reflected in each Formative Assessment task given to students throughout the five Modules.*

♦ **ASSESSMENT GUIDELINES**

Assessment is an integral component of syllabus. Its major functions include facilitating learning, providing information which may be used by students and teachers in the planning of subsequent instructional experiences, and providing information on the highest level of proficiency demonstrated by the student. Teachers are encouraged to take advantage of the flexible structure of the programme to ensure that students demonstrate mastery of each increment of the programme before going on to the next. A student who has attained mastery should, on any subsequent occasion, and without assistance, be able to demonstrate the highest levels of proficiency on the same or an equivalent task.

The assessment for each syllabus comprises two major components: School-Based Assessment (SBA) and External Assessment (EA).

SCHOOL-BASED ASSESSMENT (SBA)

This assessment spans two phases.

Phase 1:- Formative Assessment

Teachers assess students to identify their areas of strength and weakness. This assessment may be formal or informal, and is usually continuous and integrated with teaching and learning. Some teaching and learning activities are suggested in this programme of study and the assessment tasks may either be designed or sourced by the teacher, or may be selected or adapted from those provided in the assessment column of syllabus.

Information derived from this type of assessment should be used by teachers and students in planning subsequent action. Students should be encouraged to assess themselves (self- and peer- assessment) and, wherever practical, to participate in the planning of subsequent activity. The effectiveness and management of this approach may be enhanced by sharing the assessment criteria with students before the assessment is done, or by engaging them in the development of these criteria.

Phase 2:- Summative Assessment

Teachers assess students in order to create an objective record of the highest level of proficiency demonstrated. Students may be assessed any time after the teacher deems that they have attained mastery. **Teachers may also provide exercises which integrate skills across the Modules. The students may be assessed individually or in groups, and the arrangements and scheduling may be influenced by the nature of the task, and logistical and administrative considerations.** A single standardized summative task is required for each Module. Each subject has five modules, and for each student, the teacher will submit to CXC *each of these*.

The following three specifications facilitate the standardization of the summative assessments:

(i) A generic task is outlined at the end of each Module. This task provides general specifications, and conditions which must be satisfied by the assessment undertaken by all students. However, within the limits specified, **teachers may adapt the tasks to reflect local or individual interests**. For each *assessment, at least* one example is given.

(ii) A standardized rubric or mark scheme is defined and is to be used by the teacher in scoring all students' work. This rubric/mark scheme is designed to clearly indicate the dimensions of interest and the relative importance of each; consequently, it may be used by teachers to verify the appropriateness of their adapted task. While the generic task may be adapted, the mark scheme is not to be adjusted. **The same mark scheme is to be used by all teachers and students across all centres and territories**.

(iii) It is expected that quality control and monitoring of teachers' adherence to the specifications will be arranged and managed at local level.

In order to ensure that students have reasonable opportunity to achieve and demonstrate mastery, teachers can afford their students multiple opportunities to retake or resubmit, the summative assessment for any Module. Feedback and suggestions for improvement may be provided between attempts, however, the process should be transparent and objective, and the mark awarded should be indicative of the level of proficiency that the candidate would be able to demonstrate independently. The achievement of mastery is emphasized in this programme; thus, a student will be expected to achieve a minimum of 50% of the marks available for the School-Based Assessment component that will be completed in preparation for taking the external examination.

MODULE SUMMATIVE ASSESSMENT TASKS

MODULE 1:   *Portfolio*
MODULE 2:   *Investigation*
MODULE 3:   *Construction of a Model*
MODULE 4:   *Project*
MODULE 5:   *Investigation*

MODERATION OF SCHOOL-BASED ASSESSMENT

<u>***Teachers will be required to submit when requested by CXC***</u>*, a sample of the candidates' work completed for School-Based Assessment for moderation purposes. This procedure serves to ensure that the scores awarded by teachers throughout the system are consistent with the standards set by CXC. The samples will be reassessed by a CXC examiner. The examiner's comments will be sent to teachers as Moderation feedback.*

EXTERNAL ASSESSMENT

At any given sitting, candidates may register to write the external examination in one or more subjects.   The external assessment will be a multiple-choice examination comprising 50 items.

♦ *ELIGIBILITY FOR CCSLC*

*A candidate will be awarded the CCSLC IF HE/SHE over a period of up to five years, successfully completes a minimum of **five** subjects selected as follows:*

1. ***Two compulsory subjects***

    Syllabus developed by CXC specifically for this programme

    i.   *English*
    ii.   *Mathematics*

2. **Three subjects from any group or combination of groups listed below:**

   i. **Other subjects developed by CXC specifically for CCSLC**

      a. Integrated Science
      b. Modern Languages: French or Spanish
      c. Social Studies

   ii. **CSEC, TVET and Business Studies Programme – Grades I, II, III and IV**

Home Economics: Management	Principles of Business
Clothing and Textiles	Principles of Accounts
Food and Nutrition	Electronic Document Preparation and Management
Building Technology	Electrical and Electronic Technology
Mechanical Engineering Technology	Office Administration
Agricultural Science	Information Technology
Technical Drawing	Economics

   iii. **CSEC Creative and Expressive Arts – Grades I, II, III and IV**

Music	Theatre Arts
Visual Arts	Physical Education and Sport

   iv. **TVET and other Programmes certified by other Boards**

      For example, City and Guilds, Heart Trust/NTA (Jamaica) and Royal College of Music

v.   ***TVET*** *Level 1 Programmes available in the Region*

For example, Beauty Culture, Auto Mechanics, Cabinet Making and Hospitality

vi.   ***Any locally certified enrichment programme which satisfies the criteria set by CXC***

For example, Citizenship Education and Community Service

3.   **Reporting CCSLC Results**

Scores from the School-Based Assessment (TA) and the External Assessment (EA) will be combined to give a composite score with a maximum of 100. A single subject grade will be reported. The grade boundaries are as follows:

Composite Score	Grade
75 - 100	Master
50 - 74	Competent
0 - 49	Developing Competence

4.   **Certification**

i.   A result **slip** *will be issued* after every sitting of subjects developed by CXC

ii.   ***A Certificate will be awarded after a candidate achieves a minimum of Competent in five subjects within a five-year period***.

5.   **Grading Scheme**

Candidates who satisfy the requirements as outlined for the CCSLC, will be awarded a certificate that is jointly conferred by CXC and the local Ministry of Education.

♦ FORMAT OF THE ASSESSMENT

School-Based Assessment   Five summative Module-Assessments – one per Module.

External Assessment   50 multiple choice items; each item will have four options.
(1 hour 15 minutes)

NOTES ON THE EXAMINATION

1.   CXC will set and mark the external assessment.

2.   The teacher will set and mark the assignments that make up the internal assessment of each Module using the Guidelines provided.

3.   The teacher will *submit* marks for each *of the five* Module*s*.

4.   *Samples submitted for moderation **must** be accompanied by a scoring rubric.*

5.   The teacher will submit the total mark to CXC no later than May 31.

6.   CXC will combine the marks earned on the internal and the external assessment to produce the candidate's overall grade.

7.   *All summative assessment materials must be retained by the school for at least six months after the issuing of results.*

8.   Three skills will be assessed across the School-Based Assessment and External Assessment:

(a)   Computation   -   30%
(b)   Comprehension   -   40%
(c)   Reasoning   -   30%

9.   The mark allocation for this subject is shown below.

Component	Marks Allocated					Total Marks	% Contribution to Composite Score
	Module 1	Module 2	Module 3	Module 4	Module 5		
School-Based Assessment	20	20	20	20	20	100	50
External Assessment	10	15	5	10	10	50	50
% Contribution to Composite Score	20	25	15	20	20	*****	100

10.   *A candidate will be awarded the certificate if he/she over a period of up to five years, successfully completes a minimum of five subjects as specified on pages 8.*

11.   A result slip will be provided after every sitting for which a candidate registers for the external examination in one or more subjects.

♦ MODULE 1: NUMBER AND NUMBER SENSE
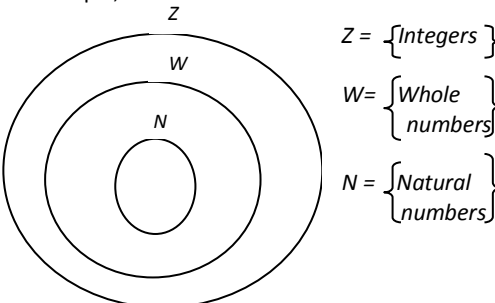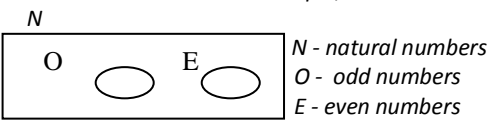
This Module contains the following topics:

(a)   Properties of Numbers;

(b)   Number Patterns;

(c)   Symbolic Representations;

(d)   Ratio;

(e)   Use of the Calculator.

♦ GENERAL OBJECTIVES

On completion of this Module, students should:

1.   *develop competence in working with numbers;*

2.   develop skills to use appropriate mental, written and calculator techniques to solve a variety of problems;

3.   develop algebraic thinking skills.

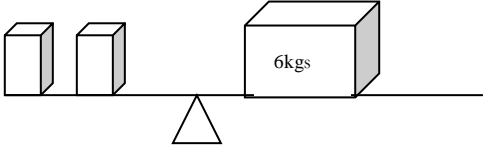|	SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:				
A.	**Properties of Numbers**			
1.	read and write numbers in the decimal (*denary*) system up to seven digits;	*Place value, face value, decimal system*	▪ Teachers could initiate discussion on the importance of place value in connection with different number systems. ▪ Teachers could initiate the use of manipulatives, for example, place value charts, to form and compare numbers in the decimal system.	▪ Have students complete worksheets, enter decimal numbers on grids or charts and state *the* value of *each* digit in a decimal number. Teacher could observe students' use of manipulatives to form and compare numbers in the decimal (denary) system. ▪ *Ha*ve students compare numbers in order of size; state the value of an underlined or shaded digit in a given number; write given numbers in words or figures.
2.	compare *numbers written in the decimal system with other number systems;*	*Roman numerals, and Hindu/ Arabic number system, emergence of zero, symbolic representation*	▪ *Teachers and students could discuss the history of Roman numerals, Hindu/Arabic number system and the emergence of zero.* ▪ *Students could work in small groups to research a given number system and make oral presentations.*	▪ *Have students create their own number system and compare it to another number system.*
3.	distinguish between types of numbers: a. natural and whole numbers; b. odd and even; c. prime and composite; d. whole numbers and integers;	Natural numbers, whole numbers, odd numbers, even numbers, prime numbers, composite numbers, integers Place value, face value, decimal system	▪ *Students could use 100 – square grids to identify the different types of numbers.* ▪ *Students could create and use games based on the properties of numbers. For example, cross word puzzles.*	▪ *Have students classify natural, whole, even, odd, prime, composite numbers and integers from a given list of numbers.* ▪ *Have students draw diagrams to show the relationship among different types of numbers.*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
			For example, $Z = \{Integers\}$ $W = \{Whole\ numbers\}$ $N = \{Natural\ numbers\}$
4. *classify* types of numbers using the knowledge of set theory;	Types of sets (finite set, infinite, null set), common features (union and intersection, Venn diagrams	▪ Students could identify different types of numbers and comment on common features ▪ Students could use diagrams to classify types of numbers. For example, N - natural numbers O - odd numbers E - even numbers	▪ Have students draw Venn diagrams to show the relationship between two types of numbers.
5. *perform* basic operations on decimals, integers, proper fractions *and* mixed numbers;	Decimal, integers, proper fractions, mixed numbers, *addition, subtraction, multiplication and division of numbers*	▪ Students could solve routine problems *created* by both teacher and students. ▪ *Students could* use different approaches and strategies to perform operations on different types of numbers *and explain the approaches used.* ▪ *Place students in groups to perform the same task. Some groups will perform the task using*	▪ *Have* students *create* their own items and perform calculations to derive answers. Teacher and students can assess *the level of difficulty* of items and variation of strategies used ▪ *Have* students draw a chart (for example, a flow chart) to show consecutive steps in an operation. Assess their sequencing and accuracy.

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
		the calculator and the other groups will perform the task manually. Students should engage in a discussion on the process.	▪ *Have students make presentations based on their findings.*
		▪ *Students could use the* calculator to *investigate* the results of performing operations on different types of numbers. *For example:* *0.5 × 0.3 =* *0.4 × 0.2 =* *0.7 × 0.4 =*	
6. deduce the inverse of a given number sentence;	*Additive identity* *Additive inverse* *Multiplicative inverse* *Multiplicative identity*	▪ *Investigate the relationship between a number sentence and its inverse. For example:* *4 × 3 = 12;* *12 ÷ 3 = 4;* *12 ÷ 4 = 3;* *3 + 7 = 10;* *10 − 7 = 3;* *10 − 3 = 7.* ▪ *Investigate the relationship between a number, its multiplicative inverse and its multiplicative identity. Deduce from results obtained that number × multiplicative inverse = 1 multiplicative identity* $6 \times \frac{1}{6} = 1;$ $\frac{2}{3} \times \frac{3}{2} = 1;$; $\frac{4}{7} \times \frac{7}{4} = 1$	▪ *Have students complete tables to show the relationship between number sentences and their inverses.*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
7. *estimate* results of operations with integers, money, decimals *and* proper fractions.	Rounding of numbers; estimation.	▪ *Rounding to the nearest whole number, ten and hundred. Estimate answers before working problems; compare estimation with real solution.* ▪ Students could use *various sporting activity* sheets to estimate the fraction of *the* total score *obtained* by particular *players*. Have students use the results *calculated* to comment on each *player's* contribution to the team's performance. ▪ If available interactive technology that would enable students to work with different types of numbers and solve problems, could be used. Certain Websites could afford students this opportunity, for example: http://www.coolmaths.com; http://www.nctm.org; http://mathsforum.org; http://bbc.co.uk/schools/numbertime/game	▪ *Have* students do self and peer-assessment to ascertain the accuracy of their estimates of fractions of total score made by *players* in a *particular sport*. ▪ *Have* students solve simple problems involving estimation. *Have student estimate the results of a given computation and justify the procedures used.*
8. *solve* problems involving integers, fractions, and decimals;			▪ *Have students work in groups to construct and solve problems.*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
B. Number Patterns			
9. recognize patterns in sets and sequences of numbers;	Patterns based on addition, subtraction, squaring, halving, doubling and tripling	▪ Teacher could discuss patterns found in the *environment*. Describe and explain patterns using diagrams, charts or any other means. ▪ *Students could investigate and extend number patterns.* *For example:* *1 = 1* *1+2+1 = 4* *1+2+3+2+1 = 9* *1+2+3+4+3+2+1 = 16* ▪ Teacher and students could *deduce* rules to describe given patterns in sequences.	▪ *Students could be given a sequence of numbers or diagrams and asked to describe the pattern. Students could deduce and write generalisations.* ▪ *Have* students create number patterns.
10. complete and extend sequences according to *a* given pattern *or rule*;	*Sequence based on square, prime, even, odd and triangular numbers*	▪ Students could construct simple models to illustrate patterns. ▪ Students could construct patterns using simple rules.	▪ *Have students complete worksheets in which they are required to extend sequences using numbers and diagrams.*
11. write multiples and factors of whole numbers;	Multiples factors, *repeated additions*	▪ Students could work with manipulatives *to construct* rows and columns of objects and explore patterns of factors or multiples of the number of objects *used*. Let them extend such patterns. F*or example:*	▪ *Have students construct grids to illustrate factors/multiples of given numbers.*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
		□□□□□□□□□□□□ *1 × 12* □□ □□□ □□ □□□ □□ □□□ □□ □□□ □□ □□ *3 × 4* *2 × 6* ▪ *Students could work in groups to explore divisibility by certain numbers such as 6 and 9 and record their observations.* ▪ *Students could use knowledge of set theory to identify common multiples and factors of two or more numbers.*	▪ *Have students report on the findings of their observations.* ▪ *Have students use knowledge of factors and multiples to solve problems in authentic situations. For example, a red light and a green light start flashing at the same time. The red light flashes every ten seconds and the green light flashes every fifteen seconds. When will they next flash together?*
C. Symbolic Representations			
12. use symbols to represent number patterns;	Algebraic terms, expressions, grouping of terms, simplification of expressions, values of terms and expressions	▪ *Students could translate from verbal and pictorial to symbolic representation. For example, represent the value of three boxes of matches and five match sticks as 3f + 5.* ▪ *Students could model expressions of the form a+1, 2(a+1), where a+1 represents a box of matches and a single match and 2(a+1) is 2 boxes of matches and 2 sticks.*	▪ *Have students work in pairs to create appropriate models of symbolic representations. Have students critique the work of their peers.* ▪ Have students write terms and expressions to represent various quantities.

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SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
13. solve number problems using symbols;	Symbolic representation of numbers and expressions basic operations on algebraic terms; directed numbers and *number sentences*	▪ *Students* could use counters to model integers in problem solving situations. ▪ *For directed numbers, teachers could use* ideas relating to temperatures (below or above zero [0]), sea level (above or below sea level) or money (owing or gaining). ▪ Teacher could engage students in problem solving *activities* in which they use both *symbolic and pictorial* representations. For example, problem solving *activities* involving the use of a game *such as the Frog game and Hand Shake.(http://freefroggame.co.uk)*	▪ Have students complete flow charts to show how to solve a problem. ▪ Assess reasoning by posing problems, such as, "I think of a number, multiply by 2, add 1 and my result is 7. What is the number?" ▪ Have students verbalize or otherwise represent their thinking *in a symbolic form. For example,* $\square \times 2 + 1 = 7$ or $\quad a + a + 1 = 7$ $\square + \square + 1 = 7 \quad\quad 2a + 1 = 7$
14. solve and verify simple linear equations in one unknown by using an algebraic approach;	*Equation, balancing method, solution, unknowns, relations, variable, inverse operation*	▪ Students could start by doing activity with *manipulatives* in which they model equations. For example: 6kgs	▪ *Have students write algebraic equations for given pictorial representations and vice versa.* ▪ *Have students complete worksheets with linear equations using the balancing method.* ▪ *For example, solve 3x + 4 = 16* *3x + 4 - 4 = 16 - 4(additive inverse)* *3x =12 (multiplicative inverse)* *3 3* *x = 4*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
		▪ Students could be *encouraged to write a given algebraic equation in as many ways as possible.* *3t + 2 = 14 could become* *t + t + t + 2 = 12 + 2* *t + t + t = 12* 　　　*OR* *3t + 2 = 12 +2* *3t = 12* *t = 4*	

D.   Ratio

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
15.　write as a ratio the relationship between two quantities;	Ratio; relationship, comparison	▪ *Guide students to recognise that a ratio is written as a:b* ▪ *Students could design and compare models of objects in their environment.*	▪ Have students complete charts to reflect ratios of ingredients *used in given recipes.*
16.　write ratios in *the* simplest form;	*Equivalent ratio*	▪ Students could explore possible combinations of the same ratio. ▪ Students could *write* their own ratios.	▪ *Have students determine the missing terms in a given ratio. For example:* *3 : 5* *n : 20*
17.　*divide* a quantity in a given ratio;		▪ Students could work in pairs *to share a quantity of objects in a given ratio. For example, twenty four sweets shared between Josh and Tiffany. For every 3 sweets Tiffany gets, Josh gets 5.* 　　　　*Tiffany　　Josh* <table><tr><td>3</td><td>5</td></tr><tr><td>3</td><td>5</td></tr><tr><td>3</td><td>5</td></tr></table>*Total*　　　*9*　　　*15*	▪ *Have* students divide *quantities* according to *given* ratios. ▪ Have students deduce the ratio, given the total quantity and one share.

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
		- Students could share actual objects in a given ratio. - Students could solve routine and non-routine problems involving simple ratios and proportion. - Students could use the unitary method to solve problems.	
E. **Use of the Calculator**			
18. use *the* calculator to perform basic mathematical operations;	Input key, output, data, display and parenthesis, order of operations.	- Teacher and students could discuss the order of operations in relation to the use of the calculator. - Teacher and students could discuss appropriate use of the calculator. *Students could use flow chart to show steps used in calculations.*	- Have students use the calculator to perform operations *similar to* the form: $2+3 \times 6$ $5^2, 20^2, 90^2$ $3 + 8 \div 2 \times 5$ - Have students perform operations with the calculator and the computer (if available) and verify the answers *using estimation or* manually. *Give students a step by step solution to an equation and have them identify the problem in the calculation.*
19. use the *calculator* to obtain squares and square roots of numbers;		*Students could estimate the square root of given numbers and use the calculator to verify their estimations.*	*Have students use the calculator to complete work sheet on squares and square roots.*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
		For example, $\sqrt{50} = \sqrt{2 \times 25}$, $\sqrt{100} = \sqrt{25 \times 4}$ *Encourage students to discuss their estimations.*	
20. read and interpret displayed quantities on the calculator.		▪ Students could perform calculations without using certain keys. For example, perform the operation 3×2 on the calculator without using the '×' key and the '2' key.	▪ *Have students work in pairs to perform a given operation on the calculator without the use of certain keys.* Have students compare and assess *the response* of their peers.

SUMMATIVE ASSESSMENT

GENERIC TASK

Competencies to be tested: Mathematical Thinking and Reasoning, Mathematical Communication, Problem Posing and Solving, Representation, Symbols, Mathematical Argumentation, Modelling, and Tools and Technology.

Students will compile a portfolio comprising a collection of four activities or investigations relating to Number and Number Sense.

The activities and or investigations should include:

1. Number pattern;
2. Number chart;
3. Number puzzle;
4. Use of the calculator.

Students should provide a description of the process used to carry out the activities and or investigations. Description should be reflective and include strategies used, knowledge gained and challenges encountered.

Each activity is marked out of 20. The students' mark for Module 1 will therefore total 80. Students' total mark for the portfolio must be divided by 4.

Marks

- Use of basic Mathematical operations 3
- Use of properties of numbers 2
- Outlining the rule/generalization 4
- Apply rule/generalization to extend pattern/make predictions 4
- *Reflective description* 5
- *Clarity and organization of ideas* 2

Total 20

1. Number Pattern

   Example - Sample activity

1st pattern	2nd pattern	3rd pattern

   1 dot 3 dots 6 dots

   (a) Extend the sequence to show the 4th and 5th patterns.

   (b) Outline the rule for determining the number of dots in subsequent patterns in the sequence.

   (c) Use the rule/generalization to determine the number of dots in the 10th pattern.

Rule/Generalization

(a) The number of dots in each pattern is determined by *finding the sum of all the whole numbers from one to the pattern number.*

(b)

1st pattern	2nd pattern	3rd pattern	4th pattern	5th pattern
1 dot	3 dots	6 dots	10 dots	15 dots

(c)

$$1 + 2 \rightarrow 3 + 3 \rightarrow 6 + 4 \rightarrow 10 + 5 \rightarrow 15 + 6$$

$$55 \leftarrow 10 + 45 \leftarrow 9 + 36 \leftarrow 8 + 28 \leftarrow 7 + 21$$
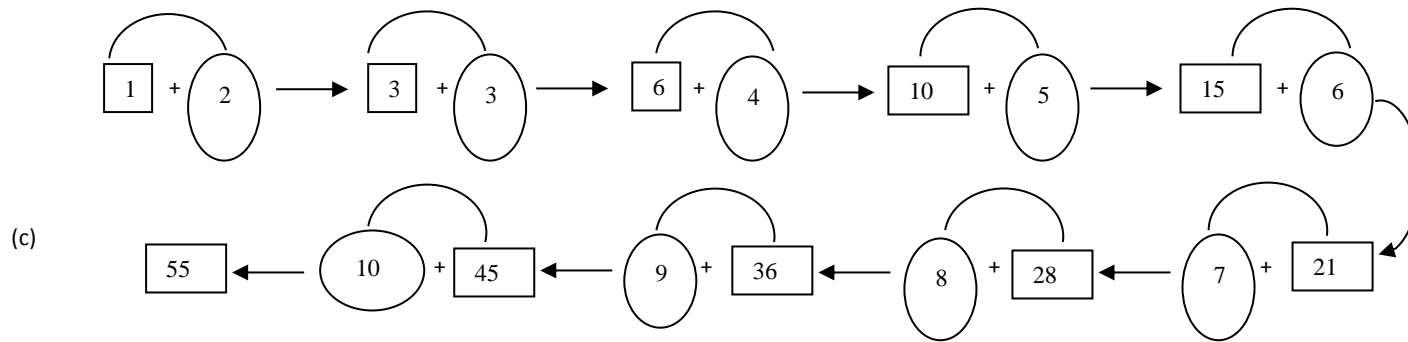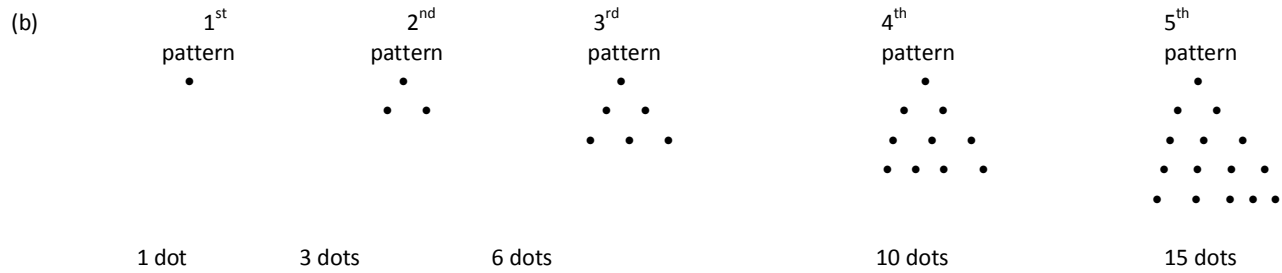
Pattern number	Number of dots
1	1
2	1+2
3	1+2+3
4	1+2+3+4
5	1+2+3+4+5
6	1+2+3+4+5+6
7	1+2+3+4+5+6+7
8	1+2+3+4+5+6+7+8
9	1+2+3+4+5+6+7+8+9
10	1+2+3+4+5+6+7+8+9+10

Alternative activities of similar patterns could include investigations such as:

(i)   Match stick pattern

(ii)   Asterisk crosses pattern

Matchstick Patterns

Matchsticks are arranged in the sequence of patterns shown below.
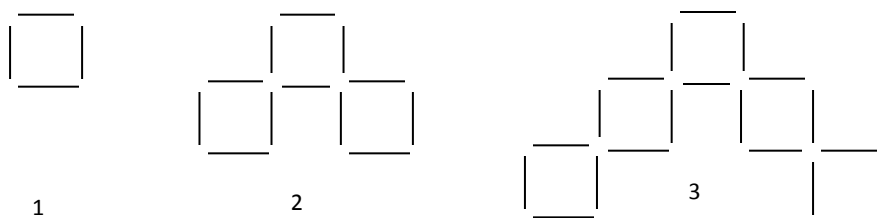
Sketch the next pattern in the sequence.

Complete the table below.

Number in sequence	Number of matchsticks
1	4
2	12
3	
4	
5	
6	
N	

Make a generalization statement about the number in the sequence and the number of matchsticks.

Use this generalization to find the number of matchsticks in the 12th pattern in the sequence.

Asterisk Crosses

Asterisks are arranged in the sequence of patterns shown below.

Sketch the next pattern in the sequence.

```
                              *
                *             *
*           *  *  *     *  *  *  *  *
                *             *
                              *
1               2             3
```
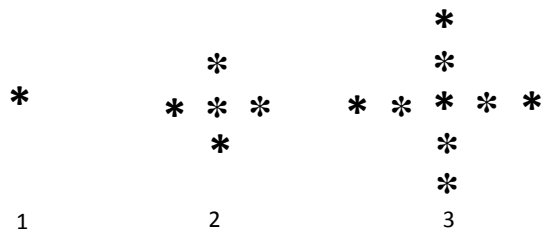
Complete the table below.

Number in sequence	Number of asterisks
1	4
2	12
3	
4	
5	
6	
7	
8	

What is the general expression for the number of asterisks in the nth pattern in the sequence, in terms of n?

Use this expression to find the number of asterisks in the 15th pattern in the sequence.

2.   Number Chart

Activity

Build a Number Chart to show the relationship between numbers.

Example/Sample activity

Number	Number divisible by		Sum of digits	Is sum divisible by	
	3	9		3	9
37	NO	NO	10	NO	NO
81	YES	YES	9	YES	YES
456	YES	NO	15	YES	NO
567	YES	YES	18	YES	YES
514					
1356					
1359					
1368					
2655					
4997					
6858					

(a)   Use the chart to obtain the rule which determines whether a number is divisible by 3.

(b)   Having studied the pattern in the chart, outline the rule which determines whether a number is divisible by both 3 and 9.

(c)   Extend the chart to include three 4 digit numbers which are divisible by 3 and 9.

3. <u>Number Puzzle</u>

Construct a Number Puzzle which must be solved by performing basic mathematical operations and applying knowledge of properties of Numbers.

<u>Example/Sample Activity</u>

1	2	
3		4
	5	
6		7
	8	

<u>Across</u>

1.   5 + 7

3.   300 + 20 + 27

6.   15 × 11

8.   39 ÷ 3

<u>Down</u>

1.   99 + 36

2.   4 × 6

4.   7 × 11

5.   20 − 4

6.   36 ÷ 2

7.   500 + 20 + 3

Answer

¹ 1	² 2	
³ 3	4	⁴ 7
5		7
	⁵ 1	
⁶ 1	6	⁷ 5
8		2
	⁸ 1	3

4. Use of the Calculator

Students will be required to use the calculator to perform operations in a variety of ways.

Example/Sample Activity

The number 2 on your calculator is damaged and cannot be used.

Use a flowchart to show 4 different ways in which you can calculate 24 x 12.

Solution

Flowchart 1:
Open Bracket → 14 → + → 10 → Close Bracket → x → Open Bracket → 16 → - → 4 → Close Bracket → =

Flowchart 2:
Open Bracket → 31 → - → 7 → Close Bracket → x → Open Bracket → 9 → + → 3 → Close Bracket → =

Flowchart 3:
Open Bracket → 96 → ÷ → 4 → Close Bracket → x → Open Bracket → 13 → - → 1 → Close Bracket → =

Flowchart 4:
3 → x → 4 → x → 4 → x → 6 → =
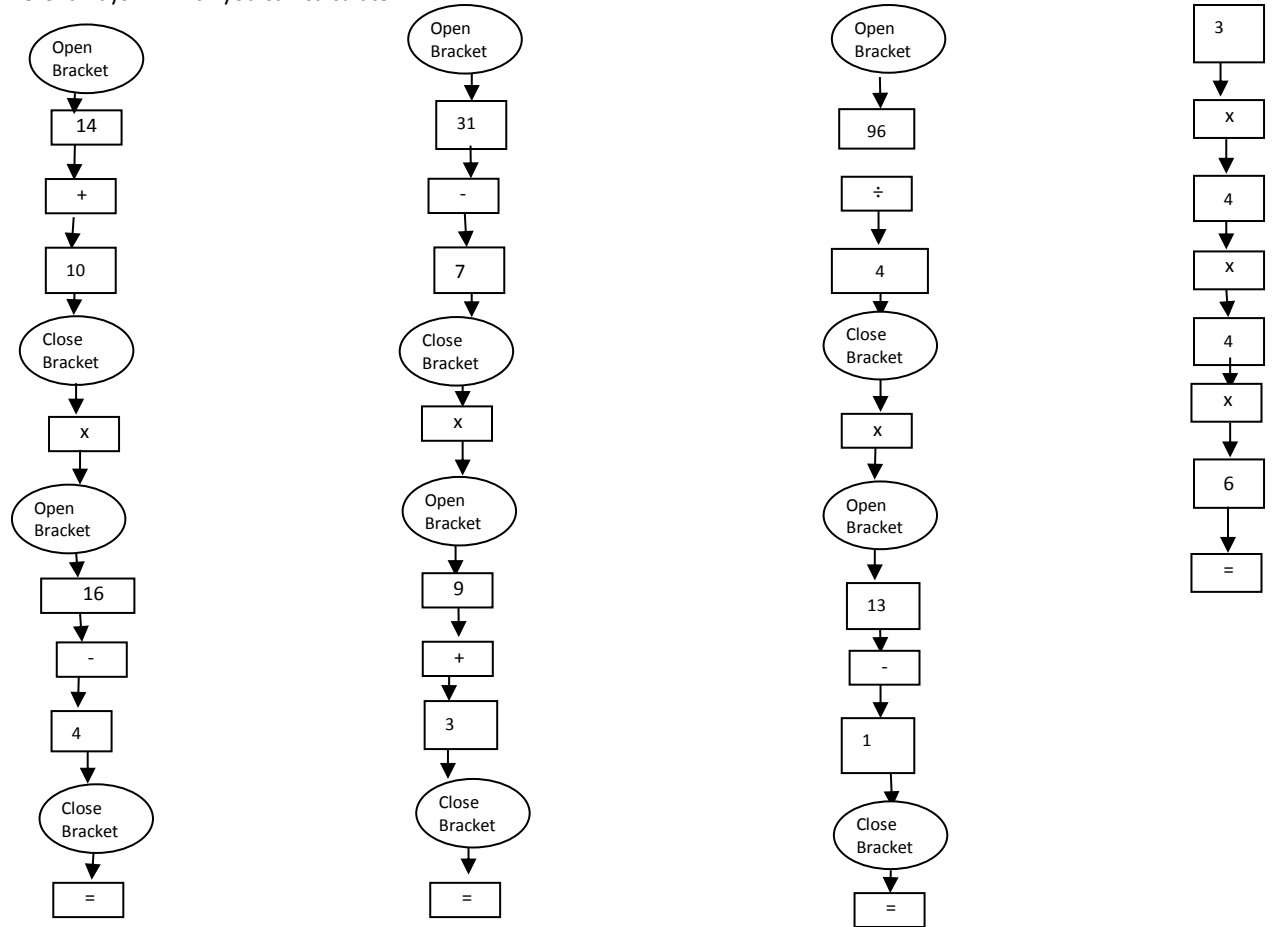
♦ **MODULE 2: CONSCIOUS CONSUMER**

This Module contains the following topics:

(a)   Percentages;

(b)   Currency;

(c)   Household Bills;

(d)   Purchasing;

(e)   Taxes;

(f)   Wages, Salary and Commission.

♦ **GENERAL OBJECTIVES**

On completion of this Module, students should:

1.   appreciate that transactions with money are integral to everyday life;

2.   develop an appreciation of the value of money, locally and internationally;

3.   understand the need for accuracy and honesty in dealing with money.

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
A. **Percentages**			
1. *express one quantity as a percentage of another*;	Percentages, conversion of percentages to fractions and fractions to percentages, comparisons (larger, smaller or equal), estimations, percentage increase and decrease, *use of calculator*	▪ Students could use scores from tests in various subjects to compare their performances. For example, Mary scored 15 out of 25 in History and 15 out of 20 in Science. In which subject did she score a higher percentage? ▪ Have *students compile scrapbook with cut outs from flyers, brochures and newspapers that illustrate the use of percentages in everyday life.* ▪ *Students could express one quantity as a percentage of another. For example, express 25cm as a percentage of 1 m.*	▪ *Have students solve problems in which the quantity is expressed as a percentage of another. For example, it rained for twenty days in the month of September. What percentage of the month did it rain?*
2. convert *fractions to* percentages and percentages to fractions;		▪ *Students could write the percentage equivalent of these fractions:* $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, \frac{1}{10}$ *and* $\frac{1}{5}$. ▪ Students could make a hundred square seed tray. Students could plant seeds in the tray and monitor their growth over a period. What percentage of the tray contained seeds? What percentages of the seeds sprouted?	▪ *Have students* complete charts or tables or diagrams relating to fractions and percentages. This should include changing fractions to percentages and percentages to fractions. *For example,* <table><tr><td>*Percentage*</td><td>25%</td><td></td><td>80%</td></tr><tr><td>*Fraction*</td><td>$\frac{1}{4}$</td><td>$\frac{1}{2}$</td><td></td></tr></table>

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
		▪ Students should make connections between certain percentages and their equivalent *fraction.* For example, 25% = $\frac{1}{4}$, 50% = $\frac{1}{2}$, 75% = $\frac{3}{4}$, 10% = $\frac{1}{10}$; *20%* = $\frac{1}{5}$	
3. determine *percentages of given quantities*;		▪ *Students could make simple comparison of percentage of quantities. For example, 10% of 100 and 20% of 200 or 25% of 400 and 25% of 200.*	Have students complete table *to determine the* percentages of *given quantities and explain* how their entries are found, for example: 		10%	25%	50%	100%	|---|---|---|---|---|	\$100						\$1000						\$10000					
4. determine estimates of percentages not exceeding 100;		▪ Students should recognise, for example, that $\dfrac{16}{30}$ represents slightly more than 50%. ▪ Students should recognize that percentages, such as, 49% and 51% are close to 50% and can be used as 50% or ½ (one half) for purposes of estimation.	▪ *Have* students do quizzes in which they state two numbers between which the percentage of a number lies. Have them state their reasoning.
5. increase or decrease a number by a given percentage;		▪ Have students send instruction cards telling someone how to increase or decrease a number by a certain	▪ *Have students perform written calculations in which they increase and decrease given quantities by a given*

	SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:				
			percentage. Other students carry out the instructions. *Students discuss the* clarity and correctness of procedures.	*percentage.*
B.	**Currency**			
6.	perform the four basic operations using money;	Currencies of CARICOM territories; other currencies, for example, US$, British Pound (£); Euro(€), Japanese Yen; operations on money; currency conversion procedures; estimation of values of one currency compared to another; basic operations on currency; conversion charts.	▪ Students could discuss the methods of trading in early civilisations. Student could investigate the emergence of money, as we know it today – the use of credit cards, debit cards or 'plastic money'. ▪ *Students could* write a paragraph on a topic such as, 'A world without money', '*The use and abuse of credit cards'.* Teachers could select a few for discussion. ▪ *Students could visit a financial institution to obtain first hand information on the use of credit cards and debit cards.*	▪ Have students *perform calculations* based on the four basic operations involving money.
7.	convert the currencies of one country to another;		▪ Students could discuss (1) the most economical method of purchasing a car (2) the advantages and disadvantages of purchasing locally or online. ▪ Students could present arguments to justify purchasing of items at different times of the year or prices in different countries. ▪ Students could create appropriate currency conversion charts and simple model bank drafts. Students could find out how much banks charge for exchanging	▪ Have students complete worksheets based on currency conversions. For example, Roger received US$10 from his mother who is currently living in the USA. If 1US$ = J$89 (Jamaica), how much would Roger receive in Jamaican dollars?

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
		currency.	
8. solve problems involving money conversions;		▪ By comparing the prices of airline tickets at various times of the week and year, students could plan a class trip to a Caribbean destination. Select a country that they see as the most economical to visit.	▪ Have students *investigate the possibility of purchasing an item from abroad in comparison to locally. Have students make oral or written presentations on their findings.* Presentations should be assessed on the following: content, application of currency conversion and communication (for example, correct use of terms, grammar), organization of information, summary or conclusion.
C. Household Bills			
9. calculate a bill given the costs of a number of items;	Unit price, estimation; charge bills; electricity bill; gas bill; telephone bill; water bill; meter reading; varied rates, *including postage, budgeting*	▪ Teacher could encourage students to create a shopping list *showing prices for a number of item*s. ▪ Teacher could set up a small class shop to purchase and sell items. Accurate records of sales and purchases should be kept. ▪ *Students could determine the change due after buying a number of items.*	▪ Have students complete worksheets with problems based on utility bills. For example, how many units of electricity have been used, if the meter reading is 24672 and the previous meter reading was 24269, what is the cost of electricity if cost per unit is $1.50?
10. compare the prices of items to select the best value for money;		▪ Students *could* compare the cost of buying lunch at school and preparing lunch at home.	▪ Have *students compare the price of the same item from different sources. For example, cellular phones.*

	SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:				
11.	solve simple problems involving household bills;		▪ Teachers could take students on a field trip to a utility company. Students could discuss with employee:: - the capability of the company to meet the demands of the population; - methods of conserving energy; - *how the bill is calculated.*	▪ *Have students use samples of actual utility bills to calculate charges on utility bills.* ▪ *Have students create a budget for a month given a specified sum of money.*
12.	*investigate the effect of conservation on utility bills.*		**NB:** These topics are *closely* related to work that may be done in Integrated Science and Social Studies and the teacher may want to draw on the ideas of teachers in these subjects. ▪ Students could: i. find out the different costs involved in producing electricity; ii. discuss how wastage affects *bills and supplies.*	▪ *Have students prepare posters, skits and jingles to illustrate various aspects of conservation as it relates to utility use.* *Have students assess the presentations.*
D.	**Purchasing**			
13.	*distinguish among the terms profit, loss, tax, discount and interest;*	Cost price; selling price; profit; loss; discount price; hire purchase price (hp), cash price, *sale price*, deposit, instalments, saving, investing, bank statements, cheques, overdraft, sales tax (VAT- Value	▪ *Students could construct tables/web diagrams to investigate the relationship among profit, loss, tax, discount and interest.*	▪ Have students draw web diagrams to display the connection between terms and the situations in which they arise. Have them display their charts for peers to assess.

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
	Added Tax, GCT- General Consumption Tax); simple and compound interest; depreciation, *percentage profit or loss*		
14. relate interest to buying, selling, *and saving*;		▪ Students could discuss the need to be thrifty and honest in dealing with money. ▪ Students could describe and compare the functions of banks, credit unions, mortgage houses and moneylenders. ▪ The teacher and students may establish a class bank or 'meeting turn' or 'partners' or 'sou sou', or 'box hand' so that students can save small amounts of money. ▪ Students *could* complete bank slips.	▪ Have students create flow charts in which they show where interest arises in given transactions.
15. *calculate* profit, loss, percentage profit *and* loss, discount, and discount price, taxes, sales price;		▪ Students could visit the local store to find out about profit, loss, percentage profit or loss, discount, sales tax and sale price where applicable.	▪ Have students answer questions *of the type shown* below. *A local department store is having a sale. James goes to the store and finds that there is a discount of 25% on television sets. James is interested in a television set that normally sells for $800. How much will he pay?*
16. *distinguish* among the terms principal, cost price, selling price, instalment and deposit;		▪ Students could visit the local store to find out the cash prices of furniture or appliances and the hire purchase prices for	▪ Have *students complete crossword puzzle based on the terms used in purchasing.*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
		these items. Work out the difference between hire purchase price and cash price. ▪ Students *could* discuss interest as applied in banking, credit unions and other lending agencies, including those in a cultural context. Let class discussion determine the most profitable way *to* save money. Encourage role-play and modelling.	
17. *calculate* the cost price given the selling price and the profit or loss as a sum of money;		▪ Students *could* model procedures *used to obtain profit, loss and interest*. Have them carry out the procedures with actual money and assess their reasoning, application and understanding.	▪ *Have students complete worksheet/work cards to assess Specific Objectives 17 to 19.*
18. *calculate* selling price given cost price and profit or loss as a sum of money;			
19. *solve* problems involving profit and loss;			
20. *calculate* total hire purchase price;			▪ *Have* students complete worksheets *on total hire purchase price.*
21. *solve* problems involving hire purchase;		▪ *Students could use advertisements from newspapers or flyers to ascertain cash and hire purchase prices. Students could compare the price of the items, if bought for the cash price rather than on hire*	▪ *Given* a specified sum of money, have students assess whether they have too much, enough or too little money to make purchases in which percentage quantities are to be added or taken out.

	SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:				
			purchase.	▪ Assess their ability to make correct judgements and reasonable justifications.
22.	calculate the simple interest and total *amount* for period of terms, including months and years;	*Principal* *Rate* *Time* *Simple Interest*	▪ *Students could use simple interest rates from various financial institutions to complete simple interest.*	▪ *Have students complete table involving simple interest, rate, time, principal and total amount.*
23.	calculate the compound interest for two years (the use of formula is not required);	*Compound Interest*	*Students could use compound interest rates from various financial institutions to compute compound interest.*	▪ *Have students complete work sheet on compound interest.*
24.	use knowledge of simple and compound interest to make decisions;		▪ *Students could discuss when simple interest and compound interest are used. Teacher could invite a resource person from a bank to discuss these options. Students (as a group activity) could be assigned an activity in which they borrow then repay at simple or compound interest rates. The more beneficial option may be determined by comparison.*	▪ *Have students use knowledge of simple interest and compound interest to make informed decisions in authentic situations.*
25.	calculate depreciation for 2 years (the use of formula is not required);	*Depreciation*	▪ Students could discuss local situations in which depreciation occurs. For example, machinery such as vehicles. Students could discuss the effect that depreciation has on insuring vehicles. Discussion can be extended to include the cost of maintaining a car. For example, licence, insurance, repairs, gasoline and depreciation.	▪ Have students complete pen and paper tests involving depreciation, for example: 1. A car is bought for $57000 and after a year it is valued at $52000. Find by how much the car has depreciated in value.

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
			2. If a car valued at $16000 depreciates by 10% per year, what is its value after two years?
E. Taxes			
26. distinguish *between* taxable income, *and non-taxable* income;	Income; Income tax; taxable income; *non-taxable income, allowances*	▪ Students could *use authentic tax forms to calculate tax deductions for different salaries.*	▪ Have students draw a flow chart to demonstrate their knowledge of the steps involved in computing income tax based on two rates.
27. solve problems *related to income tax;*			▪ Have *students complete simplified tax forms. Have students solve problems based on information relating to income tax.*
F. Wages, Salary and Commission			
28. perform calculations to obtain *salaries and wages;*	Wages, minimum wage, hourly rate, total annual salary, monthly salary, overtime, piece work, commission, national insurance scheme deductions	▪ *Teachers could engage students in activities which guide them to* distinguish *among* the terms: wages, hourly rate, minimum wage, overtime, basic salary, piece work, salaries and commission. ▪ Students could discuss the advantages or disadvantages of working for wages with tips or salary with commission as compared to a fixed wage or salary. ▪ Students could be given two or three employment scenarios with specified conditions such as living expenses, deductions and travel expenses. They should determine which scenario provides	▪ Have students give group presentation on their findings from the investigations about salaries and wages of different types of workers. ▪ Have students develop an instrument to assess the group presentations. ▪ Have students prepare a weekly or monthly budget which include savings to determine living expenses.

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
		optimal benefits.	
		▪ *Invite representative to speak on issues relating to* national insurance. The issue of equity as it relates to employer/employee contribution could provide a valuable learning opportunity to enhance critical thinking among students.	
29. calculate commission *based on services rendered;*		▪ *Teachers and students could discuss situations in which commission is used to determined payment for services rendered.*	▪ *Have students complete worksheets based on given commission.*
30. solve problems involving wages, salaries, overtime and commission.			▪ *Have* students complete worksheets to solve problems involving wages and salaries, overtime and commission.

SUMMATIVE ASSESSMENT

GENERIC TASK

Competencies to be tested: Mathematical Thinking and Reasoning, Mathematical Argumentation, Mathematical Communication, Problem Posing and Solving, and Tools and Technology.

Students will undertake an investigation in which they make a comparison *of the cost of two* similar items or two decisions to determine which is more feasible.

The decision must be informed by appropriate calculations and mathematical judgement.

Examples of possible Investigations:

1.   which of two similar appliances/equipment/vehicles is, "the better buy";
2.   which of two vacation packages is, "better"-"cheaper";
3.   build versus buy a house;
4.   use washing machine or take clothes to the laundry.

The task will be assessed in five areas, namely

1.   comparison;
2.   use of mathematical concepts and operations;
3.   accuracy of calculation;
4.   decision;
5.   inference /generalization /conclusion.

Scoring Rubric

Marks

1.   **Comparison** | 3 |

        (a)   Sufficiently Reasonable   3
        (b)   Reasonable but partly sufficient   2
        (c)   Reasonable but insufficient   1

2.   **Use of mathematical concepts and operations** | 5 |

        (a)   Use appropriate and varied mathematical concepts and operations   5
        (b)   Use appropriate mathematical concepts and operations   3-4
        (c)   Use mathematical concepts and operations   1-2

3.   **Accuracy of Calculation** | 6 |

        (a)   Accurate calculations   5-6
        (b)   Most calculations accurate   3-4
        (c)   Some calculations accurate   1-2

4.   **Decision** | 3 |

        (a)   Sound decision   3

(b)		Reasonable decision supported by calculation		2
(c)		Reasonable decision		1

5. **Inferences/ Generalization/Conclusion** $\boxed{3}$

(a)	Reasonable supported by finding		3
(b)	Reasonable		2
	Total		**20 marks**

Sample Task: Determine by calculation which of two stoves: Gas versus Electricity is the "better buy".

1. <u>Comparison</u>

   (a)   Cost of acquiring both stoves by cash and hire purchase
   (b)   Cost of operating both stoves- that is, cost of Gas versus cost of Electricity.

2. <u>Use of Mathematical concepts and operations.</u>

Concepts	Operations
Cash Price	Addition
Hire Purchase	Subtraction
Total Cost	Multiplication
Interest	Division
Difference	
Average	

3. <u>Accuracy of Calculation</u>
   (a)   Accurate calculations -   90% - 100%
   (b)   Most calculations accurate - 75% - 89%
   (c)   Some calculations accurate – less than 75%

4. <u>Decision</u>
   All cost factors must be taken into consideration, in order to arrive at a sound decision.

5. <u>Inference/Generalization/Conclusion</u>
   Compare and contrast each aspect of choice in order to make the final decision.

♦ MODULE 3: SPACES IN THE ENVIRONMENT

This Module contains the following topics:

(a)   Lines, Angles, *Directions*;

(b)   Plane Shapes;

(c)   Pythagoras' Theorem;

(d)   Solids: Cylinder, Cuboid and Cube.

♦ GENERAL OBJECTIVES
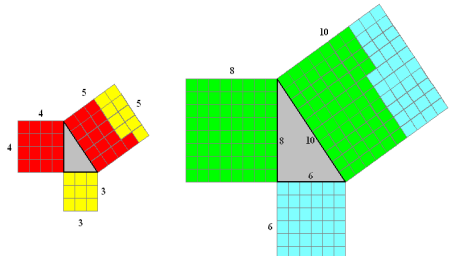
On completion of this Module, students should:

1.   develop and apply geometric properties of straight lines, polygons and circles;

2.   develop spatial awareness.

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNIG ACTIVITIES	ASSESSMENT
Students should be able to:			
A. Lines, Angles *and Directions*			
1. identify types of lines;	Line: line segment, ray, point, *transversals* Parallel, perpendicular and intersecting lines; *vertical lines; horizontal lines*	▪ *Students could draw examples of different types of lines.*	▪ Have students *work in groups to prepare charts/posters of different types of lines.*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNIG ACTIVITIES	ASSESSMENT
Students should be able to:			
2. differentiate between types of angles;	Types of angles: angles *at* a point, acute, obtuse, reflex, right, equal, vertically opposite, alternate angles, co-interior (allied) angles, corresponding and adjacent angles; *straight angles, complementary angles, supplementary angles*; clockwise and anti-clockwise rotation *Complete revolution (360 degrees); transversal*	▪ *Students could explore angle size using protractors and pre-drawn shapes.* ▪ Students could use set square to test whether *the corners of* objects are square (90 degrees). ▪ *Students could carry out activities to show the angle properties. For example, show that the size of a straight angle is equal to 180˚.*	▪ *Have students classify a given set of angles by type.* ▪ *Have students sketch examples of various types of angles.*
3. describe directions appropriately using cardinal points;	Cardinal Points: North, South, East, West North East, South West, North West, South East	▪ *Students could work in pairs; one student gives another direction to find a hidden treasure. The other students could give feedback on the clarity and accuracy of the directions given.*	▪ Given four places on the school compound, have students give the location of three of the places relative to the fourth, using cardinal points.
B. Plane Shapes			
4. state the properties of a given plane shape;	*Plane shapes, types of polygons (regular and irregular), circle, diagonals, interior angles, external angles, lines of symmetry, chord, diameter sector, radius, circumference, sets (universal subject intersection)*	▪ The teacher could initiate a class discussion on "A world without the understanding of shapes". ▪ *Students could investigate the properties of a given set of regular plane shapes.* ▪ In the local environment, students could observe geometric features in the design of buildings and observe and sketch tessellations in pavings, floorings, gates, fences.	▪ Have students use Venn diagrams to classify shapes according to their properties. ▪ Have students calculate missing angles and sides in given polygons. ▪ Have *students draw and label the parts of a circle*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNIG ACTIVITIES	ASSESSMENT
Students should be able to:			
5. classify regular shapes into sets and subsets of polygons; 6. calculate unknown angles of polygons using the properties of the particular polygon; 7. calculate *the number of sides of a regular polygon given the sum of the interior angles;*		▪ *Students could complete tables as shown below to show the relationship between the number of sides and sum of interior angles.* *(table below)* ▪ Repeat the same activity with non-right angled triangles.	▪ *Have students extend and complete the table. From the table, students could formulate appropriate generalizations.*

Table within activity:

Name of Polygon	Number of sides	Number of triangles form	Sum of angles in triangle	Sum of interior angles in Polygon
Triangle	3	1	180°	$1 \times 180°$
Quadrilateral	4	2	180°	$2 \times 180°$
Pentagon				

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNIG ACTIVITIES	ASSESSMENT
C. **Pythagoras' Theorem**			
8. *state the relationship among the sides of right angled triangles.*	Pythagoras' Theorem, right angled triangle, h*ypotenuse (longest side) square root and square numbers*	▪ Students could identify areas in the environment starting with the classroom where right angled triangles are used. ▪ Teacher could provide students with a number of right angled triangles of different sizes drawn on graph paper with squares *to show that the area of the square on the longest side is equal to the sum of the areas of the squares on the other sides.*	▪ Have students verbally explain Pythagoras' Theorem. ▪ Have students work in groups to tabulate their findings from the investigations on right angled triangles. ▪ Use the table *to formulate generalization.*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNIG ACTIVITIES	ASSESSMENT
Students should be able to:			
		For example:	
9. *apply* Pythagoras' Theorem to find unknown side in right angled triangles;		▪ Students could discuss the use of Pythagoras' Theorem and right angled triangles in the construction or building industry. ▪ *Students could investigate sets of whole numbers that would produce Pythagorean tripples.*	Have students complete a worksheet to find the unknown side of right angled triangles using Pythagoras' Theorem.
D. **Solids: Cylinder, Cuboid and Cube**			
10. *classify* solids as cubes, cuboids, cylinders *and* cones;	Cylinder, cube, cuboids, face, edge, vertices, net, *cone*.	▪ Students could collect items that represent the cylinder, cube and cuboid. Let them investigate and state the characteristics of each solid.	Given a set of objects or photographs of objects, classify them in their correct category of solids.

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNIG ACTIVITIES	ASSESSMENT
Students should be able to:			
11. *identify* characteristics of regular solids;		▪ Teacher could supply students with *nets* of solids drawn on graph paper and have them cut out and assembled them.	▪ Have *students complete table of the form:*
12. *draw* nets of these solids.		▪ Students could make decorations for Christmas and other festivals using the nets of solids.	▪ *Have students create a solid shape and design the net for it.*

Table in assessment for objective 11:

Solid	No. of faces (F)	No. of vertices (V)	No. of edges (E)	Relationship between faces and edges
cube	6	8	12	

SUMMATIVE ASSESSMENT

Competencies to be tested: Modelling, Mathematical Augmentation, Mathematical Communication, Mathematical Thinking and Reasoning, Problem Posing and Solving and Tools and Technology.

GENERIC TASK

Students will construct a model of a building or a piece of equipment or object using cardboard or Bristol board or any other suitable material. The project may be done individually or in groups.

The teacher may provide students with the dimensions of the figure to be modelled.

The model must include:

- at least 3 shapes and solids (square, rectangle, triangle, circle, cylinder, cube, cuboid)
- at least 3 types of angles (straight, right, acute, obtuse)
- *students are required to provide an outline of the process used to construct the model. Description should include steps taken in creating the model, challenges encountered, resolutions and reflection on the overall process.*

Scoring Rubric	Mark
Inclusion of 3 shapes/solids	3
Effective/creative use of shapes/solids	3
Inclusion of 3 types of angles	3
Accuracy of angles	3
Accurate labeling of model	3
Description	*3*
Overall appearance and aesthetic appeal	2
Total	**20**

♦ MODULE 4: MEASURING AROUND US

This Module contains the following topics:

(a)   *Measuring Length and Mass*;

(b)   *Measuring Perimeter and Area*;

(c)   *Measuring Volume*;

(d)   *Measuring Temperature*;

(e)   *Measuring Time, Speed and Distance*.

♦ GENERAL OBJECTIVES

On completion of this Module, students should develop computational and estimation competencies.

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
A. ***Measuring Length and Mass***			
1. identify the appropriate measuring instrument for measuring length and mass;	Ruler, measuring tape, *balance, scale, metre rule, standard and non-standard methods of measurement*	▪ *Teacher could generate a discussion that will lead to the need for standardized measure. For example, the teacher could have 2 or 3 students measure the lengths of desks using hand span. They should discover the inconsistencies in the measuring instrument (hand span) used.*	▪ *Have students complete a table matching objects with appropriate instruments of measurement. For example:* *Objects* / *Appropriate instruments* *pencil* / *ruler*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
		▪ *Students could determine the most appropriate instruments used for measuring the length and mass of a variety of objects.*	
2. identify the most appropriate unit for measuring a given quantity;	Millimetre (mm), centimetre (cm), metre (m), kilometre (km); gram (g), kilogram (kg)	▪ Given various quantities, students could determine the appropriate form of units to quote measures. For example, when is it more appropriate to *use kilogram or grams to record the mass of flour?*	▪ *Have students determine the most appropriate unit for recording and reporting the measurement of objects.*
3. measure *length and mass accurately*;	*Estimations, conversions, measuring instruments.*	▪ Students could estimate a classmate's height and verify using a metre rule. ▪ Students could estimate the mass of different objects and verify by using a *balance*.	▪ *Have students estimate the mass and length of a given set of objects. Have students carry out the actual measurements and compare with estimates.*
4. convert from *one unit to another within the same system;*	*Converting:* *(i) kilometre to metre* *(ii) metre to centimetre* *(iii) kilogram to gram*	▪ Students could design a conversion table, for example, grams to kilograms.	▪ *Have* students complete tables to show equivalent measures of length and mass using different units as shown in the example below. <table><tr><td>1km</td><td>1000m</td></tr><tr><td>1m</td><td>100cm</td></tr><tr><td>2km</td><td></td></tr><tr><td>---</td><td>-----</td></tr></table>
5. convert *from one system of measure to another and between systems;*	*Converting:* *(i) kilogram (kg) to pound (lb)* *(ii) metre (m) to yard* *(iii) kilometre (km) to miles*	▪ Students could use measuring instruments graduated in both systems of units and report on the mass of the same object. Do the same for lengths or distances.	▪ *Have students convert measures in recipes, for example, kilograms to pounds and vice versa, or reduce amounts, for example, if recipe is for 4*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
			persons and is needed for 2 persons instead, then convert kilograms to grams. Where possible, have students write a small programme to do the conversions.
B. *Measuring Perimeter and Area*			
6. find the perimeter and the area of regular and irregular *plane* shapes;	*Area, perimeter, plane shapes, square units, pi (π) =*$\frac{22}{7}$ *= 3.142.* Surface Area	▪ *Have students estimate the area of irregular shapes, for example, a leaf, the skin on your hand, compound shapes.* ▪ *Students could investigate the relationship between the diameter and the circumference of circles of varying sizes by measuring the circumstances and diameter of each circle. Have students tabulate results and discuss findings.* ▪ Students could explain how they would find the *distance* around an irregular and regular shape, for example, school buildings. ▪ *Students could separate the faces of a cuboid (box) and find the area of each face, hence, the total surface area. This activity could be extended to the surface area of a cylinder.*	▪ *Have students design a flow chart to give instructions on how to find the area and perimeter of given shapes.* ▪ *Have students use the relationship between the diameter and circumference to estimate the circumference and or the diameter.* ▪ *Have students calculate the area and perimeter of given shapes.*
7. solve problems relating to plane shapes;		▪ Students *could* use car park in the school yard to investigate how many cars can be parked in the yard without touching one another and with the *ability* to manoeuvre safely and comfortably.	▪ *Have students discuss scenarios based on authentic situations. For example, how many students can be seated in a classroom safely and comfortably?*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
		▪ *Students could discuss the findings of their investigations*	
C. **Measuring *Volume***			
8. calculate the volume of cylinder, cube and cuboid;	Surface area, volume of solids and liquids, *capacity, volume*.	▪ *Students could stack unit cubes to form cuboids and relate the volume of the cuboid to the number of unit cubes used. From the activity students can be guided to generate a rule for finding the volume. Volume of cuboid = $L \times W \times H$ = base area $\times$ height.* ▪ *Use the rule generated to deduce a rule to find volume of cylinder. This is volume of cylinder = base area $\times$ height $= \pi r^2 \times h$.*	▪ Have students find *the volume of liquids and regular solids.*
9. make reasonable estimates of volumes;		▪ Students could classify items that have volume only, and those items that have capacity only. They should compare the capacities of various containers using standard and non-standard units. ▪ Students could apply their knowledge of surface area and volume to solve practical problems, for example, given the volume of an aquarium, students estimate how many 2 litre bottles of water would be required to fill the aquarium completely. They could assess the accuracy of their estimates by carrying out the exercise and comparing the estimate with the actual result from the experiment.	▪ Have *students estimate the volume of cylinders and cuboids then verify by using actual measurements.*

	SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:				
10.	solve practical problems relating to surface area and volume;	*Measuring liquids in millilitres, litres. Convert gallons to litres. Convert between litres and millilitres. Convert teaspoon, table spoon and dropper to millilitres.*	▪ Solve real life problems, for example, how long would a bottle of 650 ml of cough medicine last if a child is taking 2 teaspoon full twice daily. *1 teaspoon ≅ 5 ml.*	▪ *Have students find the volume of irregular shaped objects by using displacement of liquid.*
D.	**Measuring Temperature**			
11.	measure temperature;	Degree Fahrenheit; *degree Celsius*, thermometer, temperature estimates, *directed numbers.*	▪ Students could design a conversion table by taking each other's body temperature; temperature of water under different conditions (room, boiling, ice) using thermometers that have Fahrenheit and Celsius scales.	▪ *Have students solve simple problems relating to temperature.*
12.	convert from *degree* Celsius to *degree* Fahrenheit and vice versa;			
13.	make reasonable estimate of temperature equivalence on Celsius and Fahrenheit scales;		▪ Students could use the conversion chart developed in class, to estimate the temperature of liquids on both scales.	
E.	**Measuring Time, Speed and Distance**			
14.	perform *calculations involving time*;	*12 and 24 hour clocks, Time zones, stop clock*	▪ *Students could calculate the time that lapses between leaving home and arriving at school. If they are consistently late then make time adjustments where possible. The importance of punctuality can be discussed at this point.*	▪ *Have* students complete tables to show comparison between times in not more than three countries.
			▪ Students *could read time in 12 and 24 hour formats.*	▪ *Have* students use conversion table developed in class to complete worksheets to show relationship between 12 hour and 24 hour clocks.
			▪ Convert *between 12 hour and 24 hour clock*.	

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNING ACTIVITIES	ASSESSMENT
Students should be able to:			
		▪ Students *could complete* tables showing time in different countries based on time zones. ▪ Students could design arrival charts for passengers taking flights from one country to another in different time zones.	
15. solve problems relating to time, distance and speed.	*Speed, distance, time*	▪ Students could time each other running or walking 50yd or 100m and estimate the speed.	▪ Have students perform simple calculation involving time, distance and speed.

SUMMATIVE ASSESSMENT

Competencies to be tested: Mathematical Thinking and Reasoning, Mathematical Argumentation, Mathematical Communication, Modelling, Problem Posing and Solving, Representation, Symbols, and Tools and Technology.

GENERIC TASK

Students will:

1.   *Choose a room with an irregular shape.*

2.   *Sketch the outline of the floor.*

3.   *Choose an appropriate measuring instrument that can be used to find the dimensions of the room.*

4.   *Determine the length of board needed to place a skirting board (strip of board) along the base where the wall meets the floor.*

5.   *The floor is to be covered with tiles. Select a square tile of an appropriate size to cover the floor. Show on your diagram how the tiles will be laid.*

6.   *State the number of tiles that are needed to cover the floor.*

7. *Give the number of boxes of tiles that need to be bought if each box contains ten tiles.*

8. *Describe the knowledge gained in carrying out this task.*

9. *Document experiences gained from undertaking the task.*

<u>**Scoring Rubric**</u>

			Marks
1.	**Choice of room**		*1*
2.	**Sketch of room showing dimension**		*2*
	(a) 2 or more sides correct	2	
	(b) 1 side correct	1	
3.	**Use of appropriate instrument**		*1*
4.	**Accuracy of measurement/use of room**		*1*
5.	**Calculation of perimeter/length of board**		*3*
	(a) Strategies used	2	
	(b) Correct answer	1	
6.	**Least number of tiles needed**		*5*
	(a) Choice of appropriate size tile	1	
	(b) Arrangement of tiles	2	
	(c) Students correct total	1	
	(d) Number of boxes needed	1	
7.	**Creativity/Overall Presentation**		
			2
8.	**Description /Reflection**		
			5
	(a) Description of approach used	2	
	(b) Experiences gained	2	
	(c) Clarity of communicating ideas	1	_____
		Total	***20***

♦ MODULE 5: DATA HANDLING

This Module contains the following topics:

(a)   Data Collection;

(b)   Organization of Data;

(c)   *Statistical* Measures;

(d)   *Interpretation* of Data;

(e)   *Simple Probability*.

♦ GENERAL OBJECTIVES

On completion of this Module, students should:

1.   develop skills in collecting, summarising and interpreting data in different ways;

2.   develop the ability to use data to solve problems, make decisions, and draw conclusions and inferences;

3.   develop skills to use statistics and set theory as problem solving tools.

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNIG ACTIVITIES	ASSESSMENT
Students should be able to:			
A. **Data Collection**			
1. identify a typical representation of a given population;	Population, samples and sampling, bias.	Suggested introductions: ▪ In a study about the class, students drawn from the class is the sample and the whole class is the population. However, if a study is about boys/*girls* in the school, all boys in the school is	*Give examples of a good representation from a number of given populations.*

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNIG ACTIVITIES	ASSESSMENT
Students should be able to:			
		the population and boys/*girls* drawn from the class are part of a sample.	
2. obtain *data by using different* data collection methods;	*Data collection methods: direct measurement, questionnaire, observation, interview, recording (electronic and otherwise).*	▪ Collect data relative to students in class: - their height, shoe size, day on which they celebrate birthday this year. ▪ Actual collection of data for example; rainfall, months in which students were born. ▪ Let students take samples of various items and state the population.	▪ Have students select from a set of data collection methods, the most appropriate one that may be used to obtain data relevant to students' height*. Students should justify their choice*. ▪ Have students exhibit (class) samples of all data collected.
3. make and use tally charts to count items in a data set;	Classifying, grouping, counting, occurrence, tally chart	▪ *Students could collect and present data, for example, create a tally chart to check each vowel in a given paragraph.*	▪ Have *students construct/complete a tally chart to organize raw data.* ▪ Have students use a tally chart to count the occurrences of each vowel in a given paragraph.
B. **Organization of Data**			
4. tabulate data extracted from familiar sources in the immediate surroundings;		▪ Students could construct tables and/or charts to highlight occurrences at school, within country, for example, tourist arrival.	▪ Have students construct a frequency table from a given set of raw data.
5. construct simple bar charts, line graphs and ungrouped frequency tables;	Simple ways of organising and classifying data: pictograph, frequency tables (ungrouped), line graphs, bar chart Language: occurrence, most of the	▪ Students could work in groups to organise raw data in different ways. For example, given a set of data on rainfall over a period of months, one group of students may be asked to present the information in the form of a line graph, another group may be asked to construct a vertical bar	▪ Have students construct line graphs or bar charts from given frequency tables. ▪ Have students construct frequency tables from given bar charts or

SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNIG ACTIVITIES	ASSESSMENT
Students should be able to:			
	time, some times, frequency	chart, while another construct a horizontal bar chart. ▪ Students may exhibit or display the different representation and/or organisation of the same data as produced by each group. ▪ *Teacher and students could discuss the most appropriate way of displaying different sets of data.* ▪ Where available, teacher and students could use computer software such as Excel to input data and generate bar charts and other graphical representations.	pictographs. ▪ Have students construct a frequency table given bar charts or vice versa.
C. **Statistical Measures**			
6. state the minimum and maximum value in a set of data;	Comparison, *statistical measure*, maximum *value*, minimum *value.*	▪ Teacher and students could *discuss situations, in which the terms* always, sometimes, most of the time are used.	▪ Have students state the maximum and minimum value from a given set of data.
7. determine the range, mean, median, mode of a set of data.	Organization, smallest to largest, frequency, most often, occurrence, majority, minority; mode, mean, range, median, *extreme values*	▪ Students could determine from a given set of scores, the range, the mean, the medium and the mode.	▪ *Have students calculate the range, mean, medium and mode from a given set of data.* ▪ *Determine the mode from an ungrouped frequency, table or bar chart.*

	SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNIG ACTIVITIES	ASSESSMENT
	Students should be able to:			
8.	use calculation to show how extreme values may affect the mean of a set of scores;	Inferences	▪ *Student could give examples of data in which there are extreme values and state how they affect the mean*.	▪ Have students *identify* an extreme value from a given set of data.
9.	make inferences based on statistical measures;		▪ *Students* could discuss situations *in which each* statistical measure (mean, median, mode, range) *is most appropriate. For example, why the mean is used to compare the performance of students; why a shoe vendor is most likely to use the mode to order his stock.*	▪ *Have* students state the range of a set of data and or comment on how extreme values affect the range.
D.	**Interpretation of Data**			
10.	interpret information in frequency tables, ungrouped data, bar chart, pie charts and line graphs;	Summarising information, making inferences, drawing conclusions; *interpretation.*	▪ Teacher and students could visit Documentation Centre – Statistical Institute in one's country to source relevant data.	▪ Have students answer questions based on information presented in bar charts, line graphs, and pie chart consisting of no more than five sectors. For example, based on information presented in a line graph showing rainfall over a six month period, students may be asked to state which month had the highest rainfall; calculate the difference in the amount of rainfall between the first three and the last three months.
11.	identify patterns (trends) from a given set of data;		▪ Students could source for study in class, statistics on cultural, environmental, social and health issues in student's country or region, for example, deforestation, HIV/AIDS cases, migration, tourism. *Students should* identify and study *the* patterns *and* trends; make predictions; discuss implications for health, the environment,	▪ Have students comment orally or in writing on trends depicted in data.

	SPECIFIC OBJECTIVES	CONTENT	SUGGESTED TEACHING AND LEARNIG ACTIVITIES	ASSESSMENT
Students should be able to:				
			future planning *and* education.	
12.	*draw inferences from data to make predictions;*		▪ Using data previously collected by students: heights of students in the class; rainfall over a period of a week or month; data from statistical departments. *Students* could analyse data to make predictions and decisions. ▪ Students could critically analyse other persons' interpretation of the same data	▪ Have students make predictions based on observed trends. ▪ Students *could be given a* pencil and paper test. For example, students may be given a bar chart with five bars and asked to draw a sixth bar based on the pattern as seen in the first five bars.
E.	**Simple *Probability***			
13.	identify events that have a chance of *occurring or not occurring*;	Chance, probability, Risk possibility impossibility *choices*. *Ethical issues.*	▪ Students could discuss the likelihood of different events occurring. For example: - I will fly one day; - It will rain on a cloudy day; - I will win the lottery. ▪ Students could discuss ethical issues relating to gambling/games of chance. ▪ Students could create charts to display results of experiments *and discuss the results*.	
14.	*calculate simple probability.*	*Outcome, range (0 to 1).* Language: always, often, most likely, maybe, sometimes, never.	▪ *Students* could carry out simple experiments, for example, tossing coins, rolling die, pulling a card from a deck and *pulling a student's name from a bag containing names of all students in the class.*	▪ *Have students calculate simple probability.*

SUMMATIVE ASSESSMENT

Competencies to be tested: Mathematical Thinking and Reasoning, Mathematical Argumentation, Mathematical Communication, Modelling Representation, and Tools and Technology.

GENERIC TASK

Students will conduct a small investigation from which they will produce a report.

The report will be assessed in five areas, namely:
-        collection and organization of data
-        interpretation of data
-        conclusion
-        inferences
-        presentation

<u>**Scoring Rubric**</u>

	Marks
Collection and Organization of data	**4**
- appropriate use of tables and charts	*3-4*
- use of tables and charts	*1-2*
Presentation of data	**4**
- use a variety of pictorial forms	*2*
- suitable labelling of pictorial forms	*2*
Interpretation of data	**4**
- *accurate* interpretation of data	3-4
- reasonable interpretation of data	1-2
Conclusion	**3**
- valid conclusion based on data	*2-3*
- reasonable conclusion based on data	*1*

Inference   **3**

-          *inferences adequately supported by* data   2
-          *inferences not supported by* data   <u>1</u>

Presentation   **2**

-          *layout*   1
-          *expression*   <u>1</u>

                                                                             Total   20

♦ LEARNING GRID

<table>
<tr><td colspan="8" align="center">CURRICULUM LEARNING GRID</td></tr>
<tr>
<td rowspan="2">KEY COMPETENCY</td>
<td rowspan="2">Ref. No.</td>
<td colspan="1">Key skills and abilities</td>
<td colspan="5" align="center">Subjects of the Curriculum</td>
</tr>
<tr>
<td>Learners will be able to:</td>
<td>Eng.</td>
<td>Mod. Lang.</td>
<td>Math.</td>
<td>Int. Sc.</td>
<td>Soc. Stud.</td>
</tr>
<tr>
<td rowspan="6">Ability to communicate orally and in writing</td>
<td>Eng. 1</td>
<td>▪ communicate information, orally and in writing</td>
<td>●</td><td>√</td><td>√</td><td>√</td><td>√</td>
</tr>
<tr>
<td>Eng. 2</td>
<td>▪ read and interpret information at the literal and inferential levels</td>
<td>●</td><td>√</td><td>√</td><td>√</td><td>√</td>
</tr>
<tr>
<td>Eng. 3</td>
<td>▪ evaluate information read and viewed</td>
<td>●</td><td>√</td><td>√</td><td>√</td><td>√</td>
</tr>
<tr>
<td>Eng. 4</td>
<td>▪ source relevant information</td>
<td>●</td><td>√</td><td>√</td><td>√</td><td>√</td>
</tr>
<tr>
<td>Eng. 5</td>
<td>▪ respond appropriately to information read and viewed</td>
<td>●</td><td>√</td><td>√</td><td>√</td><td>√</td>
</tr>
<tr>
<td>Eng. 6</td>
<td>▪ write appropriately for a variety of purposes</td>
<td>●</td><td>√</td><td>√</td><td>√</td><td>√</td>
</tr>
<tr>
<td rowspan="12">Mathematical literacy</td>
<td>Math. 1</td>
<td>▪ add, multiply, subtract and divide</td>
<td></td><td></td><td>√</td><td></td><td></td>
</tr>
<tr>
<td>Math. 2</td>
<td>▪ use calculator to perform basic mathematical operations</td>
<td></td><td></td><td>●</td><td>√</td><td>√</td>
</tr>
<tr>
<td>Math. 3</td>
<td>▪ convert fractions to percentages and percentages to fractions</td>
<td></td><td></td><td>●</td><td></td><td></td>
</tr>
<tr>
<td>Math. 4</td>
<td>▪ calculate profit, loss, percentage profit or loss, discount and discount price, installment and deposit</td>
<td></td><td></td><td>●</td><td></td><td></td>
</tr>
<tr>
<td>Math. 5</td>
<td>▪ calculate the amount of an investment after a period of time</td>
<td></td><td></td><td>●</td><td></td><td></td>
</tr>
<tr>
<td>Math. 6</td>
<td>▪ determine the cost of posting letters and parcels, locally, regionally and globally</td>
<td></td><td></td><td>●</td><td></td><td></td>
</tr>
<tr>
<td>Math. 7</td>
<td>▪ convert major international currencies into local and regional currencies</td>
<td></td><td></td><td>●</td><td></td><td></td>
</tr>
<tr>
<td>Math. 8</td>
<td>▪ calculate salaries and commissions</td>
<td></td><td></td><td>●</td><td></td><td></td>
</tr>
<tr>
<td>Math. 9</td>
<td>▪ calculate utility bills</td>
<td></td><td></td><td>●</td><td>●</td><td></td>
</tr>
<tr>
<td>Math. 10</td>
<td>▪ complete income tax forms</td>
<td></td><td></td><td>●</td><td></td><td></td>
</tr>
<tr>
<td>Math. 11</td>
<td>▪ make and use tally charts</td>
<td></td><td></td><td>●</td><td>√</td><td>●</td>
</tr>
<tr>
<td>Math. 12</td>
<td>▪ extract information from pictographs, bar charts and frequency tables</td>
<td></td><td></td><td>●</td><td>√</td><td>●</td>
</tr>
</table>

		CURRICULUM LEARNING GRID					

KEY COMPETENCY	**Ref. No.**	**Key skills and abilities** Learners will be able to:	**Subjects of the Curriculum**				
			Eng.	**Mod. Lang.**	**Math.**	**Int. Sc.**	**Soc. Stud.**

KEY COMPETENCY	**Ref. No.**	**Key skills and abilities** Learners will be able to:	**Subjects of the Curriculum**				
			Eng.	**Mod. Lang.**	**Math.**	**Int. Sc.**	**Soc. Stud.**
Mathematical literacy (cont'd)	Math. 13	▪ determine range, mean, median and mode			●	●	
	Math. 14	▪ use data to make predictions			●	●	●
	Math. 15	▪ estimate the size of standard units of length and mass			●	●	
	Math. 16	▪ make reasonable estimates of areas and volumes			●	●	
Ability to function in a foreign language	Mod. Lg. 1	▪ convert short, meaningful conversation into Spanish or French		●			
	Mod. Lg. 2	▪ respond appropriately to brief instructions given in Spanish or French		●			
	Mod. Lg. 3	▪ read, understand and respond appropriately to material written in Spanish or French		●			
	Mod. Lg. 4	▪ have meaningful dialogue with a native speaker of Spanish or French		●			
Science Literacy	Int. Sc. 1	▪ use appropriate equipment to measure length, weight, density, volume and temperature			●	●	
	Int. Sc. 2	▪ observe precautions related to the use of drugs				●	●
	Int. Sc. 3	▪ observe precautions related to diseases including sexually transmitted diseases				●	√
	Int. Sc. 4	▪ take care of bodily organs including skin, breast, testes, lungs and teeth				●	√
	Int. Sc. 5	▪ adhere to a nutritionally- balance diet				●	√
	Int. Sc. 6	▪ care for the natural environment				●	√
Social and citizenship skills	Soc. St. 1	▪ cope with stressful situations					●
	Soc. St. 2	▪ behave in a socially-acceptable manner					●
	Soc. St. 3	▪ use strategies to manage conflict					●
	Soc. St. 4	▪ differentiate between fact and opinion					●
	Soc. St. 5	▪ relate positively to family, friends and groups					●
	Soc. St. 6	▪ conduct a healthy life-style				√	●

		CURRICULUM LEARNING GRID					
KEY COMPETENCY	**Ref. No.**	**Key skills and abilities**	**Subjects of the Curriculum**				
		Learners will be able to:	**Eng.**	**Mod. Lang.**	**Math.**	**Int. Sc.**	**Soc. Stud.**
	Soc. St. 7	▪ cope with domestic and social problems					●
	Soc. St. 8	▪ apply for a job or create a business					●
	Soc. St. 9	▪ complete all types of forms including job application forms	●		●		●
Social and citizenship skills (cont'd)	Soc. St. 10	▪ interpret and use information pertaining to the rights and responsibilities of workers					●
	Soc. St. 11	▪ observe desirable consumer practices			●		●
	Soc. St. 12	▪ contribute to national goals and aspirations					●
	Soc. St. 13	▪ prepare a budget	√		√		●
	Soc. St. 14	▪ cope with changes brought about by globalization and trade liberalization	√				●
	Soc. St. 15	▪ cope with peer pressure resulting from the youth culture					●
Technological Literacy	TL 1	▪ use modern technologies to conduct research and solve problems	√	√	●	●	●
	TL 2	▪ use modern technologies to conduct consumer transactions			●		●
	TL 3	▪ use computer technology to access and evaluate information	●	●	●	●	●
	TL 4	▪ cope with the changes brought along by the use of new technologies in medicine, agriculture, transportation, manufacturing, energy and communication	√	√	√	●	●

KEY TO GRID

Eng = English   Mod. Lang. = Modern Languages   Math. = Mathematics Int. Sc. = Integrated Science   Soc. Stud. = Social Studies   TL = Technological Literacy

● indicates the subject that specifically engages the learner in the development of the competency
√ indicates the related subjects that engage the learner in the development of the competency

Western Zone Office
13 June 2012

CARIBBEAN CERTIFICATE OF SECONDARY LEVEL COMPETENCE EXAMINATION

SPECIMEN
MULTIPLE CHOICE QUESTIONS
FOR

MATHEMATICS

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read each item you are about to answer and decide which choice is best.

Sample Item

10% of 250 =   Sample Answer

(A)   2.5   (A) (B) (C) (D)
(B)   25
(C)   260
(D)   2500

The best answer to this item is "25", so you should blacken answer space (B).

05134010/SPEC 2010

1.   The digit which has a value of tenth in 35.427 is

      (A)   2
      (B)   3
      (C)   4
      (D)   5

2.   What is the missing number in the sequence: 2, 5, 8, ___, 14?

      (A)   10
      (B)   11
      (C)   12
      (D)   13

3.   If $\square + 2 \times 7 = 18$, the value of $\square$ is:

      (A)   4
      (B)   9
      (C)   13
      (D)   32

4.   What is the sum of 1^2 and 3^2?

      (A)   8
      (B)   10
      (C)   11
      (D)   16

5.   If 'a' is an odd number, which of the following is also odd?

      (A)   a + 1
      (B)   a + 2
      (C)   2a
      (D)   a/2

6.   The table below shows the number of boys and the number of girls in Class 2.

Boys	Girls
12	16

      What is the ratio of boys to girls?

      (A)   3:4
      (B)   3:7
      (C)   4:3
      (D)   4:7

7.   When expressed to the nearest hundred, 458 becomes

(A)   400
(B)   450
(C)   460
(D)   500

8.   A sum of money is divided between Ken and Rose in the ration 2:3. If Rose receives $90.00, find the sum of money shared.

(A) $ 54.00
(B) $ 60.00
(C) $135.00
(D) $150.00

The sign below shows the cost of fuel at a service station.   Use the information to answer **item 9**.

```
┌─────────────────────────────────┐
│                                 │
│   FUEL COST (per litre)         │
│                                 │
│   Diesel -------------- $5.50   │
│                                 │
│   Gasoline ----------- $6.35    │
│                                 │
└─────────────────────────────────┘
```

9.   The tank of a truck holds 15 litres of diesel when full. The tank is 1/3 full of diesel. How much money is required to fill the tank?

(A) $11.84
(B) $27.50
(C) $55.00
(D $82.50

Item 10 refers to the following pattern.

```
                    *
             *      *
      *     ***   *****
             *      *
                    *
     1ˢᵗ    2ⁿᵈ    3ʳᵈ
```

10.   How many asterisks (*) are needed for the 4ᵗʰ pattern?

(A)   13
(B)   15
(C)   17
(D)   18

Use the information below to answer **item11.**

$1.00 US = $90.00 Jamaica

11.   What is the value of US$5.00 in Jamaican dollars?

(A) $ 18.00
(B) $ 85.00
(C) $ 95.00
(D) $450.00

12.   What is 5% of $40.00?

(A) $ 2.00
(B) $ 8.00
(C) $20.00
(D) $35.00

13.   The simple interest on $600.00 at 5% per year for two years is

(A) $\dfrac{\$600.00 \times 100 \times 2}{5}$

(B) $\dfrac{\$600.00 \times 5 \times 2}{100}$

(C) $\dfrac{\$600.00 \times 5}{2 \times 100}$

(D) $\dfrac{\$600.00 \times 100 \times 5}{2}$

14.   Which of the following is the largest amount?

(A)   5% of 500
(B)   10% of 200
(C)   15% of 150
(D)   20% of 50

15.   There are 150 shops in a mall, 30% of them sell clothes. How many shops do NOT sell clothes?

(A)   20
(B)   45
(C)   105
(D)   130

GO ON TO THE NEXT PAGE

A restaurant displays the sign below

DINNER SPECIAL

$120.00 per person

+ 10% tax
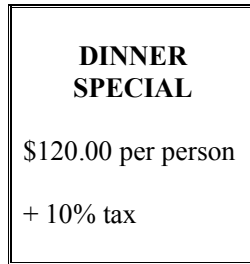
16.   The total bill for one dinner is:

(A) $108.00
(B) $110.00
(C) $130.00
(D) $132.00

Use the information below to answer **item 17.**

Cost price $1000.00
Less 20%
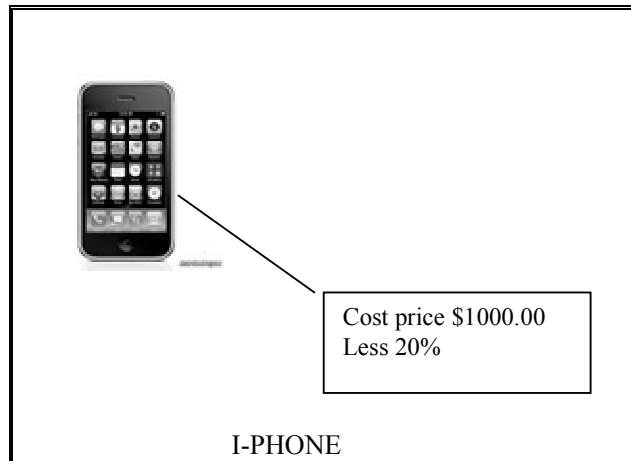
I-PHONE

17.   How much does the customer pay for the I-Phone?

(A) $ 200.00
(B) $ 800.00
(C) $1200.00
(D) $1980.00

18.   A dress costs $75.00. There is a 60% discount on all items. What is the discounted price of the dress?

(A) $ 30.00
(B) $ 45.00
(C) $105.00
(D) $120.00

<div style="border:1px solid black; display:inline-block; padding:10px;">

US $1 = EC$2.70

</div>

19.   Noah bought a Blackberry for US$300.00. He sells it for EC$540.00. What is his loss in US dollars?

(A) $100.00
(B) $240.00
(C) $270.00
(D) $271.00

Use the information below to answer **item 20.**

Prices at a local grocery store:

1 kg rice $1.30

1 tin milk $2.00

1 pack kool-aid $0.50

20.   What is the total cost of 2kgs of rice, 1 tin milk and 5 packs of kool-aid?

(A) $3.80
(B) $6.60
(C) $7.10
(D) $8.80

21.   What is ¾ as a percentage?

(A)   0.75%
(B)   7.5%
(C)   75%
(D)   750%

GO ON TO THE NEXT PAGE

Use the information below to answer **items 22 – 23.**

A group of 30 students is planning a New Year's Eve party. The table below shows the items needed and the cost of each item.

Item Needed	Cost
Hats	$2.50 each
Noisemakers	$4.00 per pack of 5
Balloons	$5.00 per pack of 10

22.   How many packs of noisemakers can be bought with $35.00?

(A)   2
(B)   5
(C)   7
(D)   8

23.   The group has a budget of $165.00. Each student will get 1 hat and 1 noisemaker. How many balloons can the group buy?

(A)   33
(B)   130
(C)   190
(D)   300

Items 24 – 25 refer to the table below which gives details of a special offer for a weekend holiday.

Airfare	Adults $75.00 Children under 15 years – $40.00
Accommodation	$100.00 each or $350.00 for family of 4

24.   A man, his wife and two children aged 17 years and 13 years, wish to have a weekend holiday. What is the LEAST cost to the family for the holiday?

(A) $585.00
(B) $615.00
(C) $635.00
(D) $665.00

25. The children invited their 16- year- old cousin to come along with them and their parents on the vacation. What is the new cost of the trip?

(A) $615.00
(B) $665.00
(C) $690.00
(D) $790.00

26. The diagonals of a quadrilateral bisect at right angles. What type of quadrilateral is this?

(A) Rectangle
(B) Square
(C) Trapezium
(D) Parallelogram

Item 27 refers to the diagram below, where AB is paralled to CD.
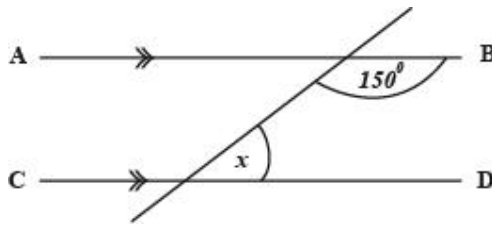
27. The value of *x* is:

(A) 75°
(B) 85°
(C) 95°
(D) 105°

Use the information below to answer **items 28 – 29.**
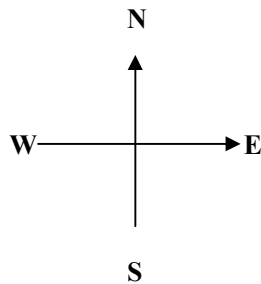
28. John is facing East. He turns 270° anti-clockwise. John is now facing

(A) North
(B) South
(C) East
(D) West

29. John turns clockwise from East to a South-West direction. What is the size of the angle through which he turns?

(A) 90°
(B) 135°
(C) 180°
(D) 225°

Item 30 refers to the diagram below which shows a triangle with 3 unequal sides.
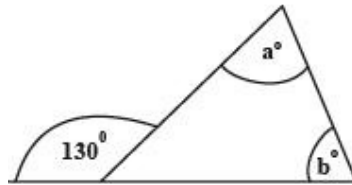
30. Which of the following BEST describes the relationship among the angles.

(A) $a = b$
(B) $b = a + 50$
(C) $a + b = 50°$
(D) $a + b = 130°$

Use the information on the diagram below to answer **item 31.**

1kg flour

31. What is the mass in grams of the package of flour?

(A) 10
(B) 100
(C) 1 000
(D) 10 000

32.   Which of the following gives the value of pi (π)?

(A)   circumference
       diameter

(B)   circumference
       radius

(C)   diameter
       circumference

(D)   radius
       circumference

Item 33 refers to the diagram below which shows a cuboid.
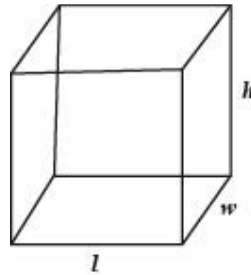
33.   The volume of the cuboid is given by:

(A) $l+w+h)$
(B) $2(l+w+h)$
(C) $l \times w \times h$
(D) $2 (l \times w \times h)$

Use the information below to answer **item 34.**

2.2 lbs = 1 kg

34.   A bag of potatoes has a mass of 44 lbs. How many kg does the bag of potatoes weigh?

(A)   20.0
(B)   41.8
(C)   46.2
(D)   96.8

GO ON TO THE NEXT PAGE

35. Which of the following tables list the most appropriate unit for measuring the length of each of the objects?

(A)

Object	Unit
Pencil	cm
Highway	km
Netball court	m

(B)

Object	Unit
Pencil	cm
Highway	m
Netball court	km

(C)

Object	Unit
Pencil	m
Highway	km
Netball court	cm

(D)

Object	Unit
Pencil	km
Highway	m
Netball court	cm

Item 36 refers to the following rectangle.

4cm

pcm
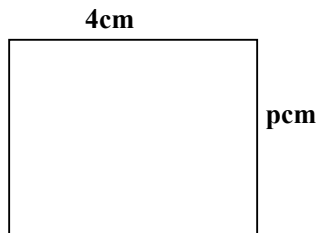
36. What is the perimeter of the rectangle in cm?

(A) $p + 4$
(B) $p + 8$
(C) $2p + 4$
(D) $2p + 8$

37.

1 lb = 16 ozs
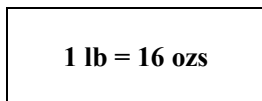
A recipe requires 3lbs of sugar to make two dozen cupcakes. How many ounces of sugar will be needed to make half dozen cupcakes?

(A)   2
(B)   4
(C)   9
(D)   12

38. Clock Q is ten minutes faster than Clock P. Which of the following BEST represents this information?

(A)

Clock Q	Clock P
8:00	7:50

(B)

Clock Q	Clock P
8:00	8:10

(C)

Clock Q	Clock P
7:50	8:00

(D)

Clock Q	Clock P
7:50	8:10

Use the information below to answer **item 39.**

The area of the rectangle PQRS is 8 cm.

4 cm

2 cm
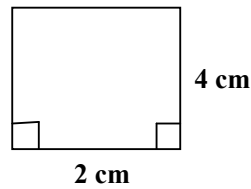
39. Which of the rectangles below has an area which is twice that of the rectangle PQRS?

(A)
8 cm
4 cm

(B)
2 cm
4 cm

(C)
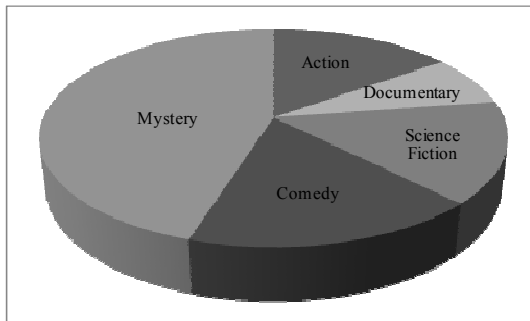**6 cm**
4 cm

(D)
2 cm
8 cm
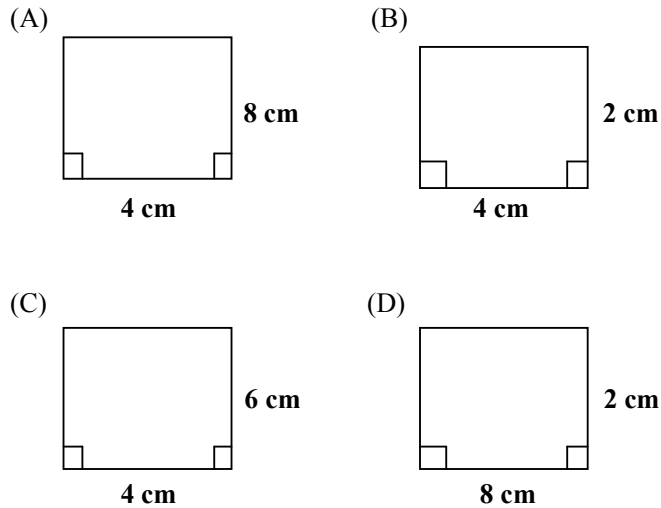
Item 40 refers to the diagram below which shows Mark's stride.
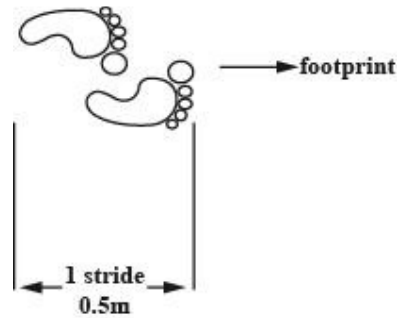
40. Mark travels a distance of 300 m. How many strides does he make?

  (A)   60
  (B)   150
  (C)   600
  (D)   1 500
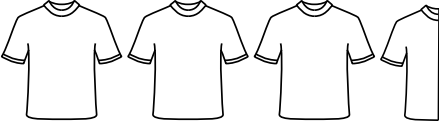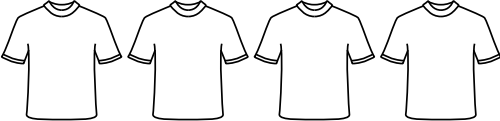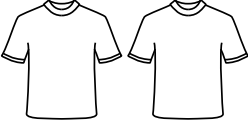
Item 41 refers to the following information.

The local video store conducted a survey on the type of movies people rented from the store. The data is shown below.

41. Which type of movie was MOST rented?

  (A)   Comedy
  (B)   Science Fiction
  (C)   Action
  (D)   Mystery

Use the information below to answer **items 42 – 43**.

The School's Drama Club held a T-shirt sale to raise funds for the purchase of a computer. The graph below shows the number of T-shirts sold during the period January to April.

Month	Number of T-shirts
January	
February	
March	
April	

 equals 10 T-shirts

42. How many T-shirts were sold during the months of January and February?

(A) 50
(B) 70
(C) 80
(D) 85

43. During which month were the MOST T-shirts sold?

(A) January
(B) February
(C) March
(D) April

GO ON TO THE NEXT PAGE

Items 44 – 46 refer to the numbers below which represent the heights in cm of seedlings.

> 10, 20, 43, 30, 10, 10

44. What is the median height of the seedlings?

    (A)   10
    (B)   15
    (C)   20
    (D)   30

45. What is the modal height of the seedlings?

    (A)   10
    (B)   20
    (C)   30
    (D)   43

46. What is the mean height of the seedlings?

    (A)   10.0
    (B)   20.5
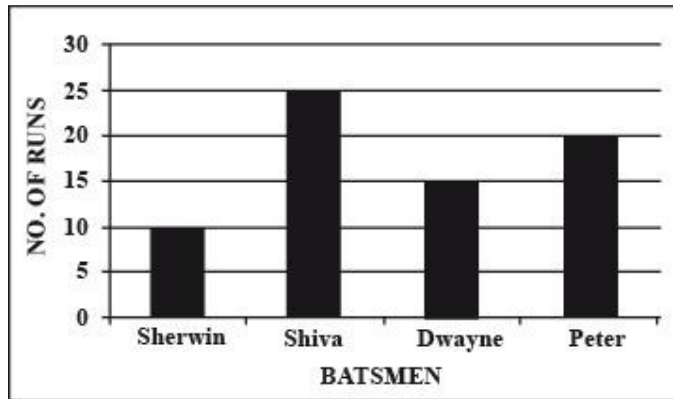   (C)   36.5
    (D)   43.0

Item 47 refers to the spinner below which is divided into six equal sections.
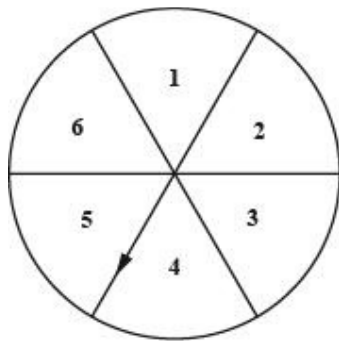
47. What is the probability that the arrow will land in the space labeled with an odd number?

    (A)   1/6
    (B)   1/3
    (C)   1/2
    (D)   2/3

Item 48 refers to the diagram below which shows the scores for four batsmen on a cricket team.

48.   The cricket team made a total of 120 runs. How many runs were scored by the rest of the team?

(A)   15
(B)   30
(C)   50
(D)   75

49.   There are four teams in a competition. Each team plays each other once. How many games are played in the competition?

(A)   4
(B)   6
(C)   10
(D)   16

Item 50 refers to the graph below which compares the rainfall in St. Kitts and Trinidad during a rainy season.
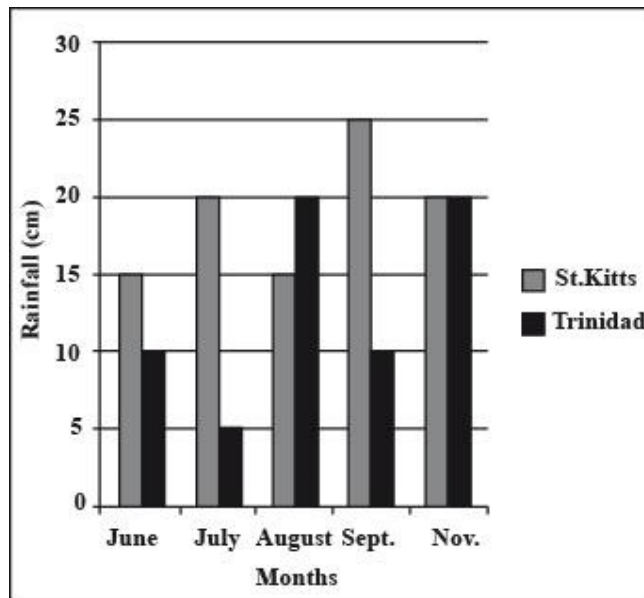
50.   How much more rain does St. Kitts get than Trinidad during the rainy season?

(A)   30
(B)   65
(C)   95
(D)   160

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN CERTIFICATE OF SECONDARY LEVEL COMPETENCY

MATHEMATICS

SPECIMEN PAPER 2010

Question No.	Syllabus Objective	Key	Skill	Question No.	Syllabus Objective	Key	Skill
1	1.A.1	C	C/K	26	3.B.4	B	C/K
2	1.B.10	B	C	27	3.A.2	A	C
3	1.C.13	A	C	28	3.A.3	B	C
4	1.E.18	B	C	29	3.A.3	B	R/A
5	1.A.3	B	C	30	3.B.6	D	R/A
6	1.D.15	A	C/K	31	4.A.4	C	C/K
7	1.A.7	D	C/K	32	4,A.6	A	C/K
8	1.D.17	D	R/A	33	4.C.8	C	C/K
9	1.A.8	C	R/A	34	4.A.5	A	C
10	1.C.9	A	R/A	35	4.A.2	A	C
11	2.B.7	D	C/K	36	4.B.6	D	C
12	2.A.1	A	C/K	37	4.A.5	D	C
13	2.D.21	B	C/K	38	4.E.14	A	R/A
14	2.A.3	A	C/K	39	4.B.6	D	R/A
15	2.A.3	C	C/K	40	4.A.3	C	R/A
16	2.D.14	D	C	41	5.D.10	D	C/K
17	2.D.14	B	C	42	5.D.10	D	C/K
18	2.D.14	A	C	43	5.D.10	A	C/K
19	2.D.16	A	C	44	5.C.7	B	C
20	2.C.9	C	C	45	5.C.7	A	C
21	2.A.2	A	C	46	5.C.7	B	C
22	2.C.9	D	R/A	47	5.E.24	B	C
23	2.C.9	B	R/A	48	5.D.10	C	R/A
24	2.C.10	B	R/A	49	5.D.12	B	R/A
25	2.C.10	D	R/A	50	5.D.12	A	R/A