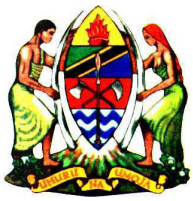
THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION AND VOCATIONAL TRAINING



BASIC MATHEMATICS SYLLABUS FOR ORDINARY SECONDARY EDUCATION

FORM I - IV

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Designed and prepared by:
Tanzania Institute of Education,
P.O. Box 35094,
Dar es Salaam,
TANZANIA.
Tel 022-2773005/2774420/2780891
Fax No. 255-51-2774420
E-mail: director. general@tie.go.tz

1.0 Introduction

This Basic Mathematics syllabus is a revised version which has been prepared to replace that of 1996 which has phased out. The revision process focused on change in paradigm from that of content based to competence based curriculum. Moreover, the revision was inevitable due to the fact that the 1996 syllabus did not sufficiently consider the current social, cultural, global, technological, subject biases and cross cutting issues taking place worldwide but particularly in Tanzanian Society.

In addition, the revision has also taken into consideration on the requirements for the Secondary Education Development Plan (SEDP). This syllabus has been introduced for implementation from January 2005.

2.0 Aims and Objectives of Education in Tanzania

The general aims and objectives of education in Tanzania are to:

(a) Guide and promote the development and improvement of the personalities of the citizens of Tanzania, their human resources and effective utilization of those resources in bringing about individual and national development.

(b) Promote the acquisition and appreciation of the culture, customs and traditions of the people of Tanzania.

(c) Promote the acquisition and appropriate use of literacy, social, scientific, vocational, technological, professional and other forms of knowledge, skills and attitudes for the development and improvement of the condition of man and society.

(d) Develop and promote self-confidence and an inquiring mind, and understanding and respect for human dignity and human rights and readiness to work hard for self-advancement and national development.

(e) Enable and expand the scope of acquisition, improvement and upgrading of mental, practical, productive and other skills needed to meet the changing needs of industry and the economy.

(f) Enable every citizen to understand the fundamentals of the National Constitution as well as the enshrined human and civic rights, obligations and responsibilities,

(g) Promote the love and respect for work, self and wage employment and improved performance in the production and service sectors.

(h) Inculcate principles of the national ethic and integrity, national and international cooperation, peace and justice through the study, understanding and adherence to the provisions of the national constitution and other international basic charter.

(i) Enable a rational use, management and conservation of the environment.

3.0 Aims and Objectives of Secondary Education in Tanzania

In Tanzania, secondary education refers to post primary formal education offered to the learners who successfully completed seven years of primary education and have met the requisite entry qualifications.

The aims and objectives of secondary education are to:

(a) Consolidate and broaden the scope of baseline ideas, knowledge, skills and attitudes acquired and developed at the primary educational level.

(b) Enhance the development and appreciation of national unity, identity and ethic, personal integrity, respect for human rights, cultural and moral values, customs, traditions and civic responsibilities and obligations.

(c) Promote the development of competency in linguistic ability and effective use of communication skills in Kiswahili and in at least one foreign language.

(d) Provide opportunities for the acquisition of knowledge, skills, attitudes and understanding in prescribed or selected fields of study.

(e) Prepare students for tertiary and higher education, vocational, technical and professional training.

(f) Inculcate a sense and ability for self-study, self-confidence and self-advancement in new frontiers of science and technology, academic and occupational knowledge and skills.

(g) Prepare the student to join the world of work.

4.0 General Competences

By the end of the four years course, the student should have the ability to:

(a) Think critically and logically in interpreting and solving problems.

(b) Use mathematical languages in explaining and clarifying mathematical ideas.

(c) Apply mathematical knowledge and techniques in other fields.

5.0 General Objectives

By the end of the four years course, the student should be able to:

(a) Promote the development and application of mathematical skills in solving practical problems in daily life.

(b) Apply mathematical concepts in interpreting situations at local and global levels.

(c) Develop a foundation of mathematical knowledge, techniques and life skills for studying mathematics and related subjects.

6.0 Structure and Organization of the Syllabus

This Basic Mathematics syllabus has a slightly different structure compared to that of 1997. The following items were added for improvement:

(a) General competences for the whole course.
(b) Competences for each class, i.e Form One to Form Four.
(c) Suggested areas for assessment.
(d) Number of periods per sub-topic.
(e) Column for sub-topics.

The structure of the syllabus is as follows:

6.1 Class Level Competences

Competences are skills, knowledge and attitudes attained by the learners after the learning process. Competences have been stated for each class/level of Basic Mathematics course. The class level objectives are derived from the class level competences.

6.2 Class Level Objectives

For each competence intended to be achieved, one or more objectives haves been stated in order to achieve it. The general objectives for Form One to Form Four are stated in general terms to indicate the scope of content to be covered within each level.

6.3 Topics

The topics have been derived from the class level competences and objectives. Some topics in the 1997 Basic Mathematics syllabus have been retained. Also some content from Cross-Cutting Issues (CCI), and the phased out bias subjects have been integrated. Topics have been arranged to attain a logical order starting from the simple to the most difficult ones. Both block and spiral arrangements of topics have been adopted.

6.4 Sub-Topic

Topics have been divided into sub-topics. The subtopics have been arranged to attain a logical order.

6.5 Specific Objectives

Each sub-topic has one or more specific objectives. These specific objectives are the expected outcomes in classroom instruction. They also reflect the process to attain competences within the cognitive, affective and psychomotor domains.

6.6 Teaching and Learning Strategies

The Column of teaching and learning strategies indicates what the teacher and students are expected to be doing in the process of teaching and learning. Students are encouraged to work in small groups for maximum participatory and cooperative learning. The teacher shall assume the role of a facilitator to promote, guide and help students learning activities. The whole teaching and learning process should be a participatory and interactive, where

the students learns by doing a series of logical activities.

These suggested teaching and learning (T/L) strategies are not exhaustive. The teacher and students may use other learner centered strategy which suit the T/L environment.

6.7 Teaching and Learning Resources

In the teaching of Basic Mathematics a great variety of teaching – learning resources will be needed in quality and quantity. In case the commercial varieties of T/L resources are not available, the teacher should work with students to collect or improvise alternative resources available in the environment.

6.8 Assessment

For every specific instructional objective, there is/are some suggested question(s) or areas for assessment. Formative and summative assessments should be geared towards mastery of the competences and skills developed within the course

6.9 Number of Periods

Number of periods is an estimated time to be used to teach a given topic/sub- topic. Each period is 40 minutes. The numbers of periods have been taken into account the time needed to adequately cover the sub-topic. Some topics need more time than others depending on the nature and weight of the topic. The teacher is advised to make maximum use of time allocated in classroom instruction. Lost instructional time should always be compensated for.

DECLARATION

Ordinary level secondary education is a four years course which has been designed to prepare students for the Advanced Level or other tertiary education. A student will be recognized as a form four graduate when he/she successfully completes and pass secondary education examinations conducted by the National Examination Council of Tanzania.

This document is hereby declared as the Syllabus of Basic Mathematics for ordinary level secondary education course.

Commissioner for Education
Ministry of Education and Vocational Training

FORM ONE

CLASS LEVEL COMPETENCES

The student should have the ability to:

1. Distinguish different types of numbers.
2. Estimate and compute numbers accurately .
3. Convert units and fractions.
4. Handle mathematical instruments in constructing and drawing geometrical figures.
5. Solve problems on geometry, ratio, profit and loss, and simple interest.
6. Graph and interpret linear equations.

CLASS LEVEL OBJECTIVES

By the end of Form One course the student should be able to:

1. Perform computations on numbers.
2. Use approximations in solving simple problems.
3. Convert and do computations on basic units.
4. Construct and draw geometrical figures.
5. Find the angles in geometrical figures.
6. Solve linear equations in one or two unknowns.
7. Find perimeters and areas of simple geometrical figures.
8. Compute ratios, profit and loss and simple interest.
9. Draw graphs of linear equations.
10. Solve linear inequalities in one unknown .

TOPIC	SUB-TOPICS	SPECIFIC OBJECTIVES	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
1.0 NUMBERS (I)	1.1 Base ten numeration	The student should be able to: (a) Identify the place value in each digit in base ten numeration.	i) The teacher to guide students to identify base ten numeration with the ten digits. ii) Students in pairs to write the place value of each digit in any given number	i) Number cards ii) Number charts iii) Abacus	Is the student able to identify the place value of a number written in base ten?	8
		(b) Read numbers in base ten numeration up to one billion	i) The teacher to guide students to read orally numbers up to one billion ii) Students in groups to read numbers given in words and numerals	i) Number cards ii) Number charts iii) Abacus	Is the student able to read numbers in base ten numeration up to one billion?	
		(c) Write numbers in base ten numeration up to one billion.	i) The teacher to guide students to write numbers up to one billion in numerals ii) Students in pairs to practice on writing numeral of numbers up to one billions given words and vise versa.	Number cards	Is the student able to write numbers in base ten numeration up to one billion?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(d) Apply numbers in daily life	i) The teacher to guide students to discuss the role of numbers in daily life. ii) Students to highlight common applications of numbers in daily life.	i) Abacus ii) Number cards	Is the student able to apply numbers in daily life?	
	1.2 Natural and Whole Numbers	The student should be able to: (a) Distinguish between natural and whole numbers.	i) The teacher to demonstrate natural and whole numbers using the number line, ii) Students to perform a role play on numbers	i) The number line ii) Number cards iii) Number charts iv) Colored chalk	Is the student able to distinguish between natural and whole numbers?	6
		(b) Identify even, odd and prime numbers	i) The teacher to guide students to discuss the difference between even, odd and prime numbers. ii) Students in pairs to identify even, odd and prime numbers from other numbers.	Number charts	Is the student able to identify even, odd and prime numbers?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(c) Show even, odd and prime numbers on number line.	(i) The teacher to guide students to show even, odd and prime numbers on the number line. (ii) Students individually to practice on the identification of even, odd and prime numbers using a number line.	i) Number line ii) Eratosthenes sieve	Is the student able to show even, odd and prime numbers on number line?	
		(d) Find factors of a given number	i) Students in pairs to list all factors of given numbers. ii) Students individuallyto find the factors of given numbers using a factor tree or repeated division	Factor tree	Is the student able to find factors of a given number?	8
		(e) Use factors to find the greatest common factor (GCF) of numbers of two or more numbers	i) The teacher to guide students to identify common factors of two or more numbers.	i) Factor tree ii) Factor chart	Is the student able to use factors to find GCF?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			ii) The teacher to guide students to discuss how to find the greatest common factor of two or more numbers. iii) Students in pairs to find GCF of two or more numbers using a set factor/ divisors or prime factors.			12

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(f) Use factors or multiples to find the lowest common multiple (LCM)	i) The teacher to guide students to identify common multiples of two or more numbers. ii) The teacher to guide a discussion on how to find the lowest common multiples (LCM) of two or more numbers. iii) Students in groups to find the LCM of numbers using multiples and prime factors.	i) Factors tree ii) Number charts	Is the student able to use factors or multiples to find LCM?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	1.3 Integers	The students should be able to: (a) Identify integers	i) The teacher to guide discussion on real life examples which portray the concepts of positive and negative numbers such as debts and credits, above and below sea level and temperatures above and below zero. ii) The teacher to demonstrate to the students how to represent integers on the number line. iii) Students individually to practice on the representation of integers on a number line.	i) Manila paper ii) Marker pens	Is the student able identify integers?	12

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Add integers.	i) The teacher to demonstrate on the use of the number line to perform addition of integers ii) Students in groups to perform addition of integers using a number line	Abacus	Is the student able to add integers?	
		(c) Subtract integers.	i) The teacher to guide students to use the number line to perform subtraction of integers ii) Students in pairs to perform subtraction of integers using a number line.	i) Manila Paper ii) Abacus iii) Marker pens iv) Number line	Is the student able to subtract integers	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(d) Multiply integers.	i) The teacher to guide students to perform the multiplication of integers. ii) Students individually to multiply integers using a number line.	i) Manila paper ii) Marker pens iii) Number line	Is the student able to multiply integers?	
		(e) Divide integers.	i) The teacher to guide a discussion on the division of integers. ii) Students in pairs to perform division of integers.	i) Manila paper ii) Marker pens	Is the student able to divide integers?	
		(f) Perform mixed operations on integers	i) The teacher to demonstrate the multiplication and division of integers involving different signs and the same signs using BODMAS rule.	i) Manila paper ii) Abacus iii) Marker pens	Is the student able to perform mixed operations on integers?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			ii) Students individually to perform multiplication and division of integers with different signs.			
2.0 FRACTIONS	2.1 Proper, Improper and Mixed Numbers	The student should be able to: (a) Describe a fraction.	i) The teacher to use familiar examples to demonstrate fractions ii) The students to discuss other familiar examples of fractions.	i) Oranges ii) Paper iii) Cards	Is the student able to describe a fraction?	8
		(b) Distinguish proper, improper fractions and mixed numbers.	i) Teacher to guide students to compare and contrast numerator and denominator, different fractions, so as to distinguish between proper and improper fractions. ii) Students in pairs to generate mixed numbers from improper fractions.	i) Knife ii) Pair of scissors iii) Cuisenaire rods iv) Manila paper v) Razor blade	Is the student able to distinguish between proper, improper and mixed numbers?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	2.2 Comparison of Fractions	The student should be able to: (a) Simplify a fraction to its lowest terms	i) The teacher to demonstrate to students how to simplify fractions to lowest terms. ii) Students individually to simplify fractions to the lowest terms.	Number of line	Is the student able to simplify fractions to lowest terms?	10
		(b) Identify equivalent fractions	i) The teacher to demonstrate how to generate equivalent fractions by multiplying or dividing the numerator and denominator by the same number ii) Students in pairs to demonstrate equivalent fractions	i) Cuisenaire rods ii) Manila paper iii) Oranges	Is the student able to identify equivalent fractions?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(c) Arrange fractions in order of size	i) The teacher to guide discussion on how to use LCM to compare different fractions ii) Students in groups to use LCM to compare fractions	Cuisenaire rods	Is the student able to arrange fractions in order of size?	
	2.3 Operations on Fractions	The student should be able to: (a) Add fractions	i) The teacher to guide students to perform addition of fractions using real objects. ii) Students in groups to perform addition of fractions.	i) Oranges ii) Manila iii) Marker pens	Is the student able to add fractions?	12

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Subtract fractions	i) The teacher to guide students to perform subtraction of fractions using real objects. ii) Students in pairs to perform subtraction of fractions using real objects.	i) Manila paper ii) Marker pen iii) Real objects	Is the student able to subtract fractions?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(c) Multiply fractions	i) The teacher to guide students to conduct multiplication of fractions using illustration. ii) Students in groups to conduct multiplication of fractions using illustration	i) Manila paper ii) Marker pens iii) Illustration	Is the student able to multiply fractions?	
		(d) Divide fractions	i) The teacher to demonstrate the division of fractions. ii) Students in groups to perform division of fractions using real objects	i) Manila paper ii) Marker pen iii) Oranges	Is the student able to divide fractions?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(e) Perform mixed operations on fractions	i) The teacher to guide students to solve mixed operations on fractions. ii) Students in pairs to perform mixed operations on fractions	i) Manila paper ii) Marker pen iii) Oranges	Is the student able to perform mixed operations of fractions?	
		(f) Solve word problems involving fractions.	i) The teacher to formulate practical problems involving fractions and guide students in solving them systematically. ii) Students in groups to translate word problems into equations and solve them systematically	Manila paper	Is the student able to solve word problems involving/ fractions?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
3.0 DECIMALS AND PERCENTAGES	3.1 Decimals	The student should be able to: (a) Explain the concept of decimals.	i) The teacher to guide students to explain the concept of decimals through brainstorming. ii) The students individually to relate decimals and fractions with denominator equal to 10	i) Shillings ii) Cents	Is the student able to explain the concept of decimal?	4
		(b) Convert fractions to terminating and repeating decimals and vice versa	i) The teacher to demonstrate the conversion of fractions to terminating and repeating decimals and vice versa ii) Students in pairs to demonstrate the conversion of fractions to terminating and repeating decimals and vice versa	i) Shillings ii) Cents	Is the student able to convert fractions to terminating and repeating decimal and vice versa?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	3.2 Operations on Decimals	The student should be able to: (a) Add decimals	ii) Students in groups to solve problems involving addition of decimals.	i) Shillings ii) Cents	Is the student able to add decimals?	12
		(b) Subtract decimals	i) The teacher to demonstrate the plotting of the decimals on the number line. ii) Students in pairs to practice the plotting of decimals on the number line iii) Students individually to subtract decimals	i) Cents ii) Shillings	Is the student able to subtract decimals?	
		(c) Multiply decimals	i) The teacher to guide students to discuss the multiplication of decimals horizontally and vertically ii) Students in groups to multiply decimals	i) Cents ii) Shillings	Is the student able to multiply decimals?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(d) Divide decimals	i) The teacher to guide students to discuss the division of decimals. ii) Students individually to demonstrate the division of decimals	i) Shillings ii) Cents	Is the student able to divide decimals?	
		(e) Perform mixed operations with decimals	i) The teacher to demonstrate the subtraction of decimals vertically and horizontally. ii) Students in pairs to perform mixed operations with fractions.	i) Shillings ii) Cents	Is the student able to perform mixed operations with decimals?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(f) Solve word problems involving decimals	i) The teacher to formulate practical problems involving fractions and guide students in solving them systematically. ii) Students in groups to formulate equations from given word problems and solve them.	i) Shillings ii) Cents	Is the student able to solve word problems involving decimals?	
	3.3 Percentages	The student should be able to: (a) Express a quantity as a percentage	i) The teacher to discuss with students how to express a quantity as a percentage ii) The teacher to show students how to write percentages using the symbol (%) iii) Students in groups to` convert given quantities into percentages.	i) Shillings ii) Cents	Is the student able to express quantities as percentages?	8

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Convert a fraction into percentage and vice versa	i) The teacher to demonstrate the conversion of fractions into percentages by multiplying by 100. ii) The teacher to guide students to discuss how to convert percentages into fractions by dividing by 100. iii) Students in pairs to do exercises on converting fractions into percentages and vice versa.	Charts	Is the student able to convert fractions into percentages and percentages into fractions?	
		(c) Convert a decimal into percentage and vice versa	i) The teacher to guide a discussion with students how to convert decimals into percentages.	Charts	Is the student able to convert a decimal into percentage and percentage into decimal?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			ii) The teacher to guide students to convert percentages into decimals			
		(d) Apply percentages in daily life	i) The teacher to guide students to discuss how to solve daily life problems involving percentages. ii) Students individually	i) Pie charts ii) Research reports	Is the student able to apply percentages in daily life?	
4.0 UNITS	4.1 Units of Length	The student should be able to: (a) Convert one unit of length to another	i) The teacher to guide students to discuss the metric system of length and their prefixes ii) Students in groups to estimate and measure different lengths in their surroundings.	i) Tape measure, rule, ii) Treadle wheel, charts of units of length	Is the students able to convert one unit of length to another?	4

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Perform computations on metric units of length.	i) The teacher to demonstrate the computation and conversion of one unit into the other. ii) Students in groups to do computations on metric units of length using the basic operations.	i) Meter ruler ii) Charts	Is the student able to compute calculations involving metric unit of lengths?	
	4.2 Units of Mass	The student should be able to: (a) Convert one unit of mass to another	i) The teacher to guide students to discuss the metric system of mass and their prefixes. ii) The teacher to demonstrate the conversion of one unit to the other iii) Students in groups to estimate and measure different weights in their surrounding. Discuss conversion from one unit to another	i) Weighing scale ii) Spring balance iii) Standard weights charts of units of mass	Is the student able to convert one unit of mass to another?	4

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Perform computation on metric units of mass	i) The teacher to demonstrate the computations on metric unit of mass ii) Students in groups to do computations on metric units of mass using basic operations		Is the student able to compute calculation involving metric units of mass.?	
	4.3 Units of time	The student should be able to: (a) Convert one unit of time to another	i) The teacher to guide students to discuss how to read and write time using a 12 hour clock ii) The teacher to demonstrate the conversion of one unit of time to another iii) Students in groups to do exercises on conversion of one unit of time to the other	i) Clock ii) Clock faces iii) Time tables	Is the student able to convert one unit of time to another?	4

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Read and convert unit time of 12 hour clock to 24 hour clock and vice versa	i) The teacher to guide student to discuss how to read and write time using a 24 hour clock. ii) The teacher to guide students to discuss on how to convert time from 12 hour clock to a 24-hour clock and vice versa. iii) The students in groups to do exercises on how to read time using the 24 hours clock. iv) The students in groups to convert times of 12 hour clock to 24hour clock	i) 24 hour clock ii) 12 hour clock	Is the student able to convert time in 12 hours to 24 hours clock?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	4.4 Units of Capacity	Student should be able to: (a) State the standard unit of measuring capacity	i) The teacher to describe the meaning of capacity and relate it with volume of quantities. ii) The teacher to guide a discussion on how a litre is related to other units of volume. iii) Students individually to state the unit of capacity and convert a litre into other units of volumes and vice versa.	i) Litre container ii) Bottles	Is the student able to state the standard unit of measuring capacity?	4
		(b) Use the litre in daily life	i) The teacher to guide students to brainstorm on various daily life situations in which a litre is applied to measure capacity. ii) Students in groups to solve problems related to unit of capacity.	Containers with capacities in litres	Is the student able to measure in litres?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
5.0 APPROXIMATIONS	5.1 Rounding off Numbers	The students should be able to: (a) Round off whole numbers to given place values	i) The teacher to show students how to round off numbers when the digit to the right is less than 5 and when the digit to the right is greater than or equal to 5. ii) Students in pairs to round off whole numbers when the digit to the rights is less than 5 and when it is greater than or equal to 5.	i) Number ii) Charts	Is the student able to round off numbers to given place value?	4
		(b) Round off decimals to a given number of decimal places	i) The teacher to guide students to round off decimals to the given number of decimal places when the digit to the right are < 5 and when the digits to the right are >5. ii) Students in groups to round off number of decimal places	i) Number patterns ii) Manila paper iii) Market pens	Is the student able to round off a number to a given number of decimal places?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	5.2 Significant Figures	The student should be able to write a number to a given number of significant figures	i) The teacher to guide a discussion on how to write numbers with decimals into significant figures. ii) Students in pairs to write down the difference between decimal places and significant figures	i) Manila paper ii) Marker pens	Is the student able to write numbers to a given number of significant figures?	2
	5.3 Approximations in Calculations	The student should be able to perform approximation of all numbers in calculation.	i) The teacher to guide students to do approximations to the numbers in calculations using knowledge of round off numbers. ii) Students in groups to brainstorm on daily life circumstances in which approximations of numbers are applied.	i) Number charts ii) Manila paper iii) Market pens	Is the student able to perform approximation of numbers in calculation?	2

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
6.0 GEOMETRY	6.1 Points and Lines	The student should be able to: (a) Explain the concept of a point.	i) The teacher to guide students to discuss the concept of a point by using examples ii) Students in pairs to list various situations in which the concept of a point is used	Mathematical Set	Is the student able to explain the concept of a point?	6
		(b) Extend the concept of a point to draw a line	i) The teacher to demonstrate how the idea of points can be extended to get a straight line. ii) Students individually to practice drawing and labeling straight line	Chalk Board ruler	Is the student able to draw a line connecting given points?	
		(c) Distinguish between a line, a line segment and a ray.	i) The teacher to show the students how to draw a line, a line segment and a ray. ii) Students in groups to name a line, line segment and a ray	i) Manila paper ii) Marker pen	Is the student able to distinguish between a line, a line segment and a ray?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	6.2 Angles	The student should be able to: (a) Draw angles	ii) The teacher to show the students how to name an angle. iii) The teacher to guide students to draw and name different types of angles. For example straight line, right angle, acute, obtuse, and reflex. iv) Students in pairs to draw angles of different sizes and name them.	i) Manila paper ii) Mathematical instrument	Is the student able to draw a given angle?	6
		(b) Measure angles of different sizes using a protractor	i) The teacher to guide students to observe a protractor and measuring angles using protractor. ii) Students to practice measuring different angles using a protractor iii) The teacher to demonstrate how to draw an angle using a protractor	i) Mathematical instruments ii) Chalkboard ruler iii) Protractor	Is the student able to measure angles of different sizes using a protractor?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iv) Students in groups to practice how to measure different angles using a protractor.			
		(c) Draw angles using a protractor	i) The teacher to demonstrate how to draw an angle using a protractor ii) Students in groups to discuss how to draw different angles using a protractor	Protractor ruler	Is the student able to draw angles using a protractor?	
	6.3 Constructions	The student should be able to: (a) Construct a perpendicular bisector to a line segment.	i) The teacher to demonstrate to the students how to construct a perpendicular bisector to a line segment by using compasses ii) Students in groups to practice how to construct perpendicular bisectors to a line segment by using compasses	Mathematical instruments	Is the student able to construct a perpendicular bisector to a line segment?	12

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Construct an angle of 60^o using a pair of compasses.	i) The teacher to demonstrate to the students how to construct an angle of 60^o by using compasses. ii) Students individually to construct angles of 60^o by using compasses	Mathematical instruments	Is the student able to construct an angle of 60^o using a pair of compasses?	
		(c) Bisect a given angle	i) The teacher to illustrate to the students how to bisect an angle by using compasses ii) The teacher to guide students to construct angles of 45^o, 30^o, 50^o,120^o, 135^o by combining constructions (iii) Students individually to bisect angles using compasses	Mathematical instruments	Is the student able to bisect a given angle?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(d) Copy a given angle by construction	i) The teacher to show the students how to copy a given angle by construction ii) Students individually to copy different angles by construction	Mathematical instruments	Is the student able to copy a given angle by construction?	
		(e) Construct parallel lines	i) The teacher to demonstrate to the students how to construct parallel lines ii) The students in pairs to construct different parallel lines.	Mathematical instruments	Is the student able to construct parallel lines using compasses and set squares?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(f) Identify different types of angles formed by parallel lines and a transversal	i) The teacher to guide students to discuss different types of angles formed by parallel lines and a transversal, including corresponding angles, alternate interior angles, alternate exterior angles, vertically opposite angles, complementary angles and supplementary angles. ii) Students in pairs to find the sizes of different angles formed by parallel lines and a transversal.	Mathematical instruments	Is the student able to identify relationships of angles formed by parallel lines and a transversal?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	6.4 Polygons and Regions	The student should be able to: (a) Describe a polygon and a region	i) The teacher to guide the students to draw a polygon and its properties (sides, vertices, angles) ii) The students in group to discuss different polygons and its properties.	i) Mathematical instruments ii) Ruler	Is the student able to describe a polygon and a region?	6
		(b) Construct different types of triangles	i) The teacher to show how to draw and name triangles and guide students to discuss on the sides, vertices and angles. ii) The teacher to guide students to discuss different types of triangles and their properties	i) Mathematical instruments ii) Ruler	Is the student able to construct different types of triangles?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iii) Students in groups to draw triangles o different given sizes and describe the types of triangles and their corresponding properties?			
		(c) Construct different quadrilaterals	i) The teacher to guide students to draw triangles using mathematical sets (given three sides, one side and two angles, two sides and the included angle) ii) Students in groups to practice drawing different types of triangles given different measurements	i) Mathematical instrument ii) Geoboard iii) Rubber bands	Is the student able to construct different types of quadrilaterals?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iii) The teacher to guide students to discuss how to construct rectangles, parallelograms, square, rhombi and trapezium. (iv) Students in pairs to construct rectangles, parallelograms, squares, rhombi and trapezia.			
	6.5 Circles	The student should be able to: (a) Draw a circle	i) The teacher to guide students to identify circular objects in the surrounding. ii) The teacher to demonstrate how to draw a circle using compasses iii) The teacher to guide students to draw circles of different sizes using compasse	i) Geometrical instruments ii) Manila paper iii) Ropes iv) Geoboard v) Circular objects	Is the student able to draw a circle when given radius or diameters?	4

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Describe different parts of a circle	i) The teacher to guide students to discuss the following terms: centre, diameter, radius, chord, circumference, arc, segment, sector. ii) Students individually to draw a circle and label its parts.	Mathematical instruments	Is the student able to describe parts of a circle?	
7.0 ALGEBRA	7.1 Algebraic Operations	The student should be able to: (a) Use symbols to form algebraic expressions.	i) The teacher to use daily life examples to show how letters are used to represent objects. ii) The teacher to demonstrate to the students how letters can be used to represent numbers iii) The teacher to show students how to form algebraic expressions using letters.	Coloured chalk	Is the student able to use symbols to form algebraic expressions?	**4**

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iv) Students in pairs to form different algebraic expressions.			
		(b) Simplify algebraic expressions	i) The teacher to guide students to discuss how to add and subtract like terms. ii) Students in pairs to add and subtract given algebraic expressions. iii) The teacher to guide students to discuss on the multiplication and division of like and unlike terms. iv) Students individually to practice on the multiplication and division of like and unlike terms of algebraic expressions.	Manila Cards	Is the student able to simplify algebraic expressions?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			v) The teacher to guide students to discuss how to simplify expressions involving bracket and fractions. vi) Students in pairs to use the rule of BODMAS to simplify algebraic involving brackets.			
	7.2 Equations in one unknown	The students should be able to (a) Solve an equation in one unknown	i) The teacher to demonstrate to the students how to solve an equation in one unknown. ii) The students in groups to solve equations in one unknown.	i) Beam balance ii) coloured chalk	Is the student able to solve an equation in one unknown ?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Form and solve an equation from word problems	i) The teacher to guide the students to formulate equations involving one unknown from word problems . ii) Students in groups to formulate equations from word problems involving one unknown and solve them.			
	7.3 Equations in Two Unknowns	The student should be able to: (a) Solve simultaneous linear equations	i) The teacher to guide students to generate possible solutions (ordered pairs) of an equation in two unknowns. ii) The teacher to demonstrate how to solve linear simultaneous equations by elimination method.	i) Manila paper ii) Marker pen iii) Coloured chalk iv) Work sheets	Is the student able to solve linear simultaneous equations by elimination and substitution method?	8

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iii) The students in pairs to solve different linear simultaneous equations by elimination method. iv) The teacher to demonstrate how to solve linear simultaneous equations by the substitution method. v) The students individually to solve different linear simultaneous equations by the substitution method.			
		(b) Form linear simultaneous equations from practical situations	i) The teacher to guide students to form linear simultaneous equations from word problems ii) The students to solve linear simultaneous equations from word problems.	Worksheet	Is the student able to form linear simultaneous equations from practical situations?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(c) Solve linear inequalities from practical situations	i) Students to be guided by the teacher to solve linear inequalities involving word problems ii) Students to solve linear inequalities formulated from practical situations	Worksheet	Is the student able to solve linear inequalities involving word problems?	
	7.4 Inequalities	The student should be able to: (a) Solve linear inequalities in one unknown.	i) The teacher to guide the students on how to use the symbols >,<, ≤ in mathematical statements ii) The teacher to demonstrate to the students how to solve inequalities involving one unknown without changing the sign.	Coloured chalk	Is the student able to solve linear inequalities in one unknown?	6
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

			iii) Students to solve linear inequalities which do not involve changing of the sign iv) The teacher to demonstrate to the students to solve inequalities involving changing the sign			
		(b) Form linear inequalities from practical situations	i) The teacher to guide students group discussion on how to form linear inequalities from word problems ii) Students to formulate linear inequalities from practical situations	i) Manila paper ii) Market pens	Is the student able to form linear inequalities ?	
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

		(c) Solve linear inequalities from practical situations	i) Students to be guided by the teacher to solve linear inequalities involving word problems ii) Students to solve linear inequalities formulated from practical situations	Worksheet	Is the student able to solve linear inequalities involving word problems?	
8.0 NUMBERS (II)	8.1 Rational Numbers	The student should be able to (a) Define a rational number	i) The teacher to guide students to discuss rational numbers ii) Students in groups to define rational numbers.	i) Number line ii) Manila paper	Is the student able to define a rational number?	4
		(b) Perform the basic operations on rational numbers	i) The teacher to demonstrate to students on how to perform the basic operations with rational numbers. ii) Students to form groups and discuss on how to perform addition and subtraction with numbers.	Worksheets	Is the student able to perform the basic operations on rational numbers ?	
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

			iii) The teacher to guide students to make conclusions on the presented work. iv) The teacher to demonstrate multiplication and division of rational numbers v) Students in groups to perform basic operations on rational numbers.			
	8.2 Irrational Numbers	The students should be able to define irrational numbers	i) The teacher to explain the concept of irrational numbers using examples. ii) Students individually to outline the differences between rational and irrational numbers.	Charts	Is the student able to define a irrational number?	**2**
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

	8.3 Real Numbers	The students should be able to: (a) Define real numbers	i) The teacher to use the number line to illustrate the concept of real numbers. ii) The teacher to explain to students the concept of absolute value of real numbers using practical examples. iii) Students in groups to solve practical problems related to absolute value of a real number.	i) Manila paper ii) Marker pen iii) Graph papers	Is the student able to define real numbers? Is the student able to solve problems related to practical problems on real numbers?	**6**
		(b) Find absolute value of real numbers	i) The teacher to demonstrate the absolute value of a number ii) Students individually to find the absolute value of numbers.	Graph papers	Is the student able to find absolute value of real numbers?	
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

		(c) Solve related practical problems	i) The teacher to guide students to explore various activities in which absolute value of numbers is practiced. ii) Students in pairs to solve problems	Worksheets	Is the student able to solve problems related to real numbers?	
9.0 RATIOS, PROFIT AND LOSS	9.1 Ratio	The student should be able to: (a) Express a ratio in its simplest form	i) The teacher to guide students to discuss the relationship between ratio and fraction. ii) Students in groups to discuss on how to express a ratio in simplest form iii) The teacher to guide students to make correct conclusions	i) Money ii) Real objectives	Is the student able to express a ratio in the simplest form?	**4**
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

		(b) Divide a given quantity into proportional parts	i) The teacher to guide students to discuss on how to divide a given quantity into its proportional parts ii) Students in groups to solve real life problems related to ratios	i) Money ii) Physical items	Is the student able divide a given quantity into proportional parts?	
	9.2 Profits and Loss	The student should be able to: (a) Find profit and loss	i) The teacher to guide students to discuss on the meaning of profit and loss. ii) Students in pairs to determine profit and loss. iii) Students in pairs to determine profit and loss.	Money	Is the student able to find profit and loss?	**4**
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

		(b) Calculate percentage profit and percentage loss	i) The teacher to demonstrate how to calculate percentage profit or percentage loss. ii) Students to solve problems related to percentage profit and loss.	Worksheets	Is the student able to calculate percentage profit and percentage loss?	
	9.3 Simple Interest	The student should be able to: (a) Calculate simple interest	i) The teacher to guide students to discuss on the formula $I = \frac{PRT}{100}$ for calculating simple interest. ii) Students individually to use the formula $I = \frac{PRT}{100}$ to calculate simple interest.	i) Bank Statements	Is the student able to calculate simple interest?	**4**
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

		(b) Solve real life problems related to simple interest	i) The teacher to guide students to solve real life problems related to simple interest. ii) Students in groups to solve problems on simple interest	Worksheet	Is the student able to solve problems related to simple interest?	
10.0 COORDINATE GEOMETRY	10.1 Coordinates of a Point	The student should be able to: (a) Read the coordinates of a point	i) The teacher to guide students to discuss how to draw and label the coordinate axes. ii) The teacher to guide students to plot a point in the x-y plane. iii) Students individually to read the coordinates of given points.	i) Graph papers ii) Geoboard iii) Rubber band	Is the student able to read the coordinates of a point?	**6**
		(b) Plot a point given its coordinates	i) The teacher to guide students in plotting points of given coordinates ii) Students in groups to plot points of the given coordinate	i) Geoboard ii) Graph paper iii) Rubber band	Is the student able to plot a point given its coordinates ?	
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

		(c) Locate a point on the coordinate plane.	i) The teacher to demonstrate the location of a point on the x-y plane. ii) Students to locate points on the coordinate plane drawn on the chalkboard	Graph paper	Is the student able to read the coordinates of a given point?	
	10.2 Gradient (Slope) of a Line	The student should be able to calculate the gradient of a line given two points	i) The teacher to guide students to discuss the meaning of gradient (slope) of a line. ii) The teacher to guide students to determine the gradient of a line given two points. iii) Students individually to calculate the slope of a line given two points	i) Geoboard ii) Manila paper iii) Graph paper iv) Rubber band	Is the student able to calculate the gradient of a line given any two points?	**3**
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

	10.3 Equation of a line	The student should be able to find the equation of a line given the coordinates of two points on a line.	i) The teacher to guide students to use the definition of gradient to determine the equation of a line in the form $y = mx + c$ where m is gradient where m is gradient and c is y intercept. ii) Students to determine an equation of line in the form $y = mx + c$	i) Manila paper ii) Garboard iii) Rubber band iv) Graph paper	Is the student able to find the equation of a line given two points?	**3**
	10.4 Graphs of Linear equations	The student should be able to: (a) Form the table of values	i) The teacher to guide the students to form a table of values and intercepts of a given linear equation. ii) Students individually to find the table of values of linear equations.	i) Graph paper ii) Graph board	Is the student able to draw the graph of a linear equation?	**5**
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

		(b) Draw the graph of a linear equation	i) The teacher to demonstrate on how to draw the graph of linear equations using a table of values. ii) Students individually to use the table of values to draw the graph of linear equations	i) Graph paper ii) Graph board	Is the student able to draw the graph of a linear equation?	
	10.5 Simultaneous Equations	The student should be able to solve linear simultaneous equations graphically.	i) The teacher to guide students to plot the graph of the linear equations on the same coordinate plane. ii) Students to discuss in groups how to plot graph of the linear equations. iii) Students in pairs to solve linear simultaneous equations graphically.	i) Graph paper ii) Coloured chalk	Is the student able to solve linear simultaneous equation graphically?	2
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

11.0 PERIMETERS AND AREAS	11.1 Perimeters of Triangles and Quadrilaterals	The student should be able to find the perimeters of triangles and quadrilaterals	i) The teacher to guide students to discuss the meaning of perimeters ii) The teacher to guide students to discuss how to determine perimeters of triangles and quadrilaterals. iii) Student to perform a group work on calculation of perimeters of triangles and quadrilaterals available in the surroundings and present in a class iv) The teacher to guide students to make conclusions on the group work presentations.	i) Triangles ii) Quadrilaterals iii) Rope iv) Tape measure v) Rule	Is the student able to find the perimeters of a triangles and quadrilaterals?	2
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

	11.2 Circumference of a Circle	The student should be able to: (a) Estimate the value of pi, *Π*.	i) The teacher to guide students to measure the circumference and diameter of different circular objects practically. ii) The teacher to guide students to find the ratio of circumference, using the obtained measurement of diameter iii) The teacher to guide students to compare their results to deduce the value of Π.	i) Circular objects ii) Rope iii) Thread iv) Ruler	Is the student able to estimate the value of pi (Π)?	4
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

		(b) Calculate the circumference of a circle.	i) The teacher to demonstrate the calculation of circumference of a circle. ii) The students in groups to calculate the circumference of the circle using a formula C = Πd where d is a diameter of a circle and C is a circumference	Worksheet	Is the student able to calculate the circumference of a circle?	
	11.3 Areas of rectangles and triangles	The student should be able to: (a) Calculate the area of a rectangle	i) The teacher to guide students to discuss on how to obtain the formula for the area of rectangle. ii) Students in pairs to calculate the area of rectangles	i) Manila paper ii) Marker pen iii) Geoboard	Is the student able to calculate the area of a rectangle?	4
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

		(b) Calculate the area of a triangle	i) The teacher to guide students to discuss on how to reduce the area of a triangle from the area of a rectangle ii) Students individually to calculate the area of a triangle	i) Manila paper ii) Marker pen	Is the student able to calculate the area of a triangle?	
	11.4 Areas of trapezium and parallelogram	The student should be able to: (a) Calculate area of a parallelogram	i) The teacher to guide students to find the formula to calculating the area of parallelogram ii) Students individually to calculate the area of parallelogram	i) Manila ii) Marker pen iii) Geoboard	Is the student able to calculate the area of a parallelogram?	4
		(b) Calculate the area of a trapezium	i) The teacher to guide students to obtain the formula for calculating the area of a trapezium. ii) Students individually to calculate the area of a trapezium using the formula	i) Geoboard ii) Rubber band	Is the student able to calculate the area of a trapezium?	
TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**

	11.5 Area of a circle	The student should be able to: Calculate the area of a circle	i) The teacher should guide a students to perform a practical exercise to derive the formula for finding the area (A) of a circle using A = Πr^2 ii) Students in groups to calculate the area of a circle	Worksheets	Is the student able to calculate the area of a circle?	2

FORM TWO

CLASS LEVEL COMPENTENCES

Student should have the ability to:

1. Find relationships among logarithms, exponents, radicals, right triangles and trigonometric ratios.
2. Use mathematical tables in computations.
3. Verify laws and prove theorems.
4. Do scale drawing and geometrical transformations.
5. Factorize and solve problems.
6. Organize and interpret data.
7. Apply set operations in solving problems.

CLASS LEVEL OBJECTIVES

By the end of Form Two course thestudentshouldbeable to:

1. Derive and apply the laws of exponents, radicals and logarithms in mathematical manipulations.
2. Do calculations using mathematical tables.
3. Prove and apply congruency and similarity of figures.
4. Represent reflections, rotations, translations and enlargement geometrically.
5. Represent and interpret statistical data collected from real life situations such as Road Safety, HIV/AIDS, environment and crimes.
6. Perform operations on sets and apply sets to solve problems.

TOPIC	SUB-TOPICS	SPECIFIC OBJECTIVES	TEACHING AND LEARNING STRATEGIES	TEACHING AND LEARNING RESOURCES	ASSESSMENT	NUMBER OF PERIODS
1.0 EXPONENTS AND RADICALS	1.1 Exponents	The student should be able to: (a) List the laws of exponents	i) The teacher to display the laws of exponents by a wall chart ii) Student through think pair share to discuss laws of exponents.	Wall charts	Is the student able to state the laws of exponents?	8
		(b) Verify the laws of exponents	i) The teacher to guide students to derive the laws of exponents ii) Students in group to deduce laws of exponents	i) Mathematical tables ii) Number charts	Is the student able to verify the laws of exponents?	
		(c) Apply laws of exponents in computations	i) The teacher to guide students in applying the laws of exponents in performing related computations. ii) Students in groups to apply laws of exponents in computations		Is the student able to apply the laws of exponents in performing computations?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	1.2 Radicals	The student should be able to: (a) Simplify radicals	i) The teacher to guide students to discuss the concept of radicals using exponents. ii) The teacher to guide students to find the square roots and cube roots of numbers by prime factorization methods. iii) Students to find square roots and cube roots of numbers by prime factorization method.	Manila paper	Is the student able to simplify radicals?	12
		(b) Perform basic operations on radicals	i) The teacher to demonstrate how to add, subtract, multiply and divide radicals. ii) Students to solve problems related to operations on radicals.	i) Cube root tables ii) Square root tables iii) Multiplication tables	Is the student able to add subtract, multiply and divide radicals?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(c) Rationalize the denominator	i) The teacher to guide students to rationalize the denominator and use this method to simplify radicals to simplest form ii) Students in groups to rationalize the denominator and present their work in class	i) Manila paper ii) Multiplication tables	Is the student able to rationalize a given denominator?	
		(d) Read square roots and cube roots of numbers from mathematical tables	i) The teacher to guide students to read the square roots and cube roots of numbers using mathematical tables and calculators ii) Students to solve problems involving reading of square and cube roots of numbers from tables	i) Calculators ii) Mathematical tables	Is the student able to determine the square root and cube root of numbers	
	1.3 Transposition of Formula	The student to be able to: (a) Make one letter the subject of the formula	i) The teacher to demonstrate on how to rearrange the letters to make one letter subject of the formula.	Mathematical formula	Is the student able to make one letter the subject of the formula?	5

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			ii) Students to do chalkboard work on rearranging letters to make one letter the subject. iii) Students individually to rearrange letters and make one the subject.			
		(b) Transpose a formulae with square roots and powers	i) The teacher to guide student to discuss on transposition of formulae with roots and powers ii) Students to transpose formulae with root and powers	Mathematical formulae	Is the student able to transpose formulae with letters involving roots and powers?	
2.0 ALGEBRA	2.1 Binary Operations	The students should be able to: (a) Describe the binary operations.	The teacher and student to discuss the binary operations.	i) Mathematical formulae ii) Coloured chalks	Is the student able describe the binary operations?	5
		(b) Perform binary operations	i) The teacher to guide students to perform binary operations. ii) Students to do group work on binary operations and present in the class	i) Coloured chalks ii) Manila papers iii) Marker pens	Is the student able perform binary operations involving expression?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	2.2 Brackets in Computation	The student should be able to: (a) Perform basic operations involving brackets	i) The teacher to guide students to discuss the rules governing basic operations applied to algebra known as "BODMAS" ii) Students to discuss in groups how to apply BODMAS in computation	i) Coloured chalks ii) Manila papers iii) Market pens	Is the student able to perform operations involving brackets?	5
		(b) Simplify algebraic expression involving the basic operations and brackets	i) The teacher to guide students to simplify the algebraic expressions. ii) Students to simplify algebraic expressions	i) Coloured chalks ii) Manila papers iii) Marker pens	Is the students able to simplify algebraic expression involving the basic operations and brackets ?	
	2.3 Quadratic Expressions	The student should be able to: (a) Form a quadratic expression from two linear factors.	i) The teacher to guide students to discuss how to multiply two linear factors to form a quadratic expression. ii) Students to discuss in groups how to expanding linear factors.	i) Manila sheet ii) Marker pens	Is the student able to form quadratic expressions given two linear factors?	5

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		(b) Write the general form of a quadratic expression	i) The teacher to explain the general form of a quadratic expression $ax^2 + bx + c$ where a, b, c are real numbers and $a \neq 0$ ii) Students to re-arrange quadratic expressions in the general form	i) Coloured chalks ii) Manila papers iii) Marker pens	Is the student able to write the general form of a quadratic expression?	
	2.4 Factorization	The student should be able to: (a) Factorize linear expressions.	i) The teacher to guide students on how to factorize linear expressions. ii) Student to factorize linear expressions.		Is the student able to factorize linear expressions?	6
		(b) Factorize quadratic expressions	i) The teacher to demonstrate on how to factorize the quadratic expressions using the following methods: - inspection - Splitting the middle term - Difference of two squares - perfect squares	i) Multiplication charts ii) Factor tree iii) Coloured chalks iv) Illustrations on difference of two squares and perfect squares	Is the student able to factorize quadratic expression?	

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			ii) Students to work in groups on the four techniques of factorization and present in class.			
3.0 QUADRATIC EQUATIONS	3.1 Solving equations	The student should be able to: (a) Determine the solution of a quadratic equation by factorization.	i) The teacher to guide students to discuss the theorem of the factors of zero. ii) The teacher to guide students to determine the solution of a quadratic equation using the theorem of the factors of zero. iii) Students to find solution of quadratic equations using the theorem of the factors of zero.	i) Manila papers ii) Marker pens iii) Coloured chalks	Is the student able to determine the solution of a quadratic equation by factorization method?	8
		(b) Find the solution of a quadratic equation by completing the square	i) The teacher to demonstrate on how to find the solution of quadratic equations by completing the square.	i) Manila papers ii) Marker pens iii) Coloured chalks	Is the student able to find the solution of quadratic equations by completing the square?	

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			ii) Students to work in groups to solve quadratic equations by completing the square. iii) Students to do individual work on solving quadratic equations by completing the square.			
	3.2 General solution of a Quadratic Equation	The student should be able to: (a) Derive the quadratic formula	The teacher to guide students to derive the quadratic formula using the method of completing the square	Coloured chalks	Is the student able to derive the quadratic formula?	5
		(b) Solve quadratic equations using quadratic formula	i) The teacher to guide students on how to apply the quadratic formula to solve problems ii) Students to solve quadratic equations using the formula	Coloured chalks	Is the student able to use the quadratic formula to solve quadratic equations?	

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4.0 LOGRITHMS	4.1 Standard Form	The student should be able to: (a) Write numbers in standard form.	i) The teacher to guide students to discuss on the importance of writing a number in standard notation. ii) The teacher to demonstrate how to write numbers in standard form, where $A=10^{o}$ $1\leq A<10$. iii) Students to write numbers in standard form.	i) Manila papers ii) Coloured chalks iii) Manila pens	Is the student able to write numbers in standard form?	5
		(b) Perform computations which involve multiplication and division of numbers expressed in standard form.	i) The teacher to guide students to discuss the multiplication and division of numbers expressed in standard form. ii) Students to do questions involving multiplication and division of numbers	i) Manila papers ii) Coloured chalks iii) Marker pens	Is the student able to perform computations which involve multiplication and division of numbers when expressed in standard form?	

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	4.2 Laws of Logarithms	The students should be able to: (a) State the laws of logarithms	Teacher to guide students on how to derive the laws of logarithms	Charts of logarithmic Law	Is the student able to state the laws of logarithms?	12
		(b) Verify the laws of logarithms using the knowledge of exponents.	i) The teacher to guide students to discuss the relationship between exponents and logarithms. ii) Students to solve questions related to changing exponents to logarithms and vice versa.	Charts of logarithmic Laws	Is the student able to verify the laws of logarithms using the knowledge of exponents?	
		(c) Use the laws of logarithms to simplify logarithmic expressions	i) The teacher to guide students to derive the laws of logarithms ii) The teacher to demonstrate the use of laws of logarithms in computations. iii) Students to work in groups on simplification of logarithmic expressions and present in the class.	Charts of laws of Logarithms	Is the student able to use the laws of logarithm to simplify logarithmic expressions correctly?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(d) Solve logarithmic equation	i) The teacher to demonstrate on how to solve logarithmic equations. ii) Students to work in groups on problems involving logarithmic equations and conduct peer presentations.	Charts of logarithmic laws	Is the student able to solve logarithmic equation?	
		(e) Apply laws of logarithms to find products, quotients, roots and powers of numbers.	i) The teacher to guide students to solve problems involving laws of logarithms. ii) Student in groups to solve problems on laws of logarithms.	Charts of logarithmic laws	Is the student able to apply laws of logarithms to find products, quotient, roots and powers of numbers?	
	4.3 Tables of Logarithms	The student should be able to: (a) Read the logarithmic table	i) The teacher to use examples to explain the two parts of logarithm: Mantissa and characteristics. ii) The teacher to guide students to read the logarithmic tables for given numbers. iii) Students to read logarithms of numbers.	Tables of logarithms	Is the student able to read the logarithmic table correctly? Is the student able to use tables of antilogarithms ?	8

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			iv) The teacher to guide students to read the antilogarithm tables. v).Students to use antilogarithm tables to read numbers whose logarithms are given.			
		(b) Apply logarithmic tables to find products and quotients of numbers.	i) The teacher to guide students to use tables of logarithms, to obtain products and quotients of numbers. ii) Students to do computations on multiplication and division of numbers using logarithm tables.	Logarithmic tables	Is the student able to use logarithmic tables to find products and quotients of numbers?	
		(c) Apply logarithmic tables to find roots and powers of numbers.	i) The teacher to show the students how to use logarithmic tables to find roots and powers of numbers. ii) Students in groups to do calculations involving roots and powers using logarithmic tables.	Logarithmic tables	Is the student able to apply logarithmic tables to find roots and powers of numbers?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
5.0 CONGRUENCE	5.1 Congruence of Triangles	The student should be able to (a) Determine the conditions for congruence of triangles.	i) The teacher to explain the meaning of congruence using practical activities. ii) The teacher to lead students to explore the properties of congruent figures using practical activities. iii) Students to state and write the properties of congruent triangles.	i) Manila papers ii) Geometric figures iii) Paper cuttings iv) Photographs v) Mathematical sets vi) Marker pens vii) Geoboards	Is the student able to determine the conditions for congruence of triangles?	8
		(b) Prove congruence of triangle.	The teacher to guide students to discuss the conditions for proof of congruence of triangles: Angle Angle Side (AAS); Side, Side, Side(SSS); Side Angle Side(SAS) and Right angle Hypotenuse Side (RHS)	i) Manila papers ii) Geometric figures iii) Paper cuttings iv) Photographs v) Mathematical sets vi) Marker pens	Is the student able to prove congruence of triangles?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(c) Apply theorems on congruence of triangles to solve related problems.	i) The teacher to guide students to solve problems using the conditions for congruence of triangles ii) Students to solve problems on congruence of triangles in groups and present their work in class.	i) Manila papers ii) Geometric figures iii) Paper cuttings iv) Photographs v) Mathematical sets vi) Marker pens vii) Geoboards	Is the student able to apply congruence theorems of triangles to solve related problems?	12
6.0 SIMILARITY	6.1 Similar Figures	The student should be able to: (a) Identify similar polygons.	i) The teacher to guide students to explore the properties of similar figures using hands on activities such as paper cutting reflection in a plane mirror ii) Students to explore and write properties of similar polygons	i) Similar objects, ii) Mirror, figures iii) Geoboards iv) Paper cuttings, v) Similar pictures vi) Mathematical sets, vii) Graph papers	Is the student able to identify similar polygons?	**8**

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Prove similarity theorems using triangles	i) The teacher to guide students to discuss conditions for similarity of triangles (SSS, AAA, SAS and RHS). ii) Students to explore and write the conditions for similar triangles.	i) Manila papers ii) Marker pens	Is the student able to prove similarity theorems using triangles?	
		(c) Solve problems using similarity theorems of triangles.	i) The teacher to demonstrate on how to solve problems involving similarity of triangles using similarity theorems. ii) Students to solve problems using similarity theorems.		Is the student able to solve problems using similarity theorems of triangles?	
7.0 GEOMETRICAL TRANSFORMA-TIONS	7.1 Reflection	The student should be able to: (a) Describe the characteristics of a reflection in a plane	i) The teacher to guide students to investigate characteristics of reflection in a plane by folding and cuttings. ii) Students to investigate and write the properties of reflection.	i) Plane mirrors, ii) Geoboards, Manila sheets iii) Games, Graphs papers and identical pictures iv) Rubber bands	Is the student able to describe the characteristics of a reflection in a plane?	4

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	7.2 Rotations	The students should be able to: (a) Describe characteristics of a rotation on a plane.	i) The teacher to guide students to investigate the characteristics of a rotated object on a plane. ii) Students to state and write the properties of rotation in a plane.	i) Graph papers, ii) Geoboards, iii) Paper cuttings, iv) Mathematical sets	Is the student able to describe characteristics of a rotation on a plane?	4
		(b) Represent different rotation on a plane by drawings.	i) The teacher to guide students to draw rotations of points, lines and polygons using mathematical sets ii) Students to draw rotations of points, lines an polygons in a plane. iii) The teacher to guide students to brainstorm on how to locate the centre of rotation by construction	Mathematical set	Is the student able to represent different rotations in a plane by drawings?	

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			iv) Students to solve questions involving locating the centre of rotation v) Students in groups to apply rotation properties to solve related problems.			
	7.3 Translation	The student should be able to represent translation by drawings.	i) The teacher to guide students to discuss translation by sliding real objects, lines and figures on a plane without turning them. ii) Students to state and write properties of translation.	i) Mathematical set, ii) Graph papers iii) Geoboard iv) Rubber bands	Is the student able to state properties of translations?	4
	7.4 Enlargement	The student should be able to: (a) Develop a scale of enlargement.	i) The teacher to guide students to discuss the relationship between similarities and hence develop scale of enlargement. ii) Students to solve problems related to developing scale factor	i) Mathematical set ii) Different figures/objects iii) Photographs	Is the student able to develop scale of enlargement?	12

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		(b) Identify enlarged figures.	i) The teacher to guide students to discuss how to identify enlarged figures ii) Students to brainstorm and write the properties of enlargement	i) Graph paper ii) Picture cuttings iii) Paper cuttings	Is the student able to identify enlarged figures?	
		(c) Construct enlargement of a given figures.	i) The teacher to demonstrate how to construct enlargement of a given figure ii) Students to do chalkboard work on constructing enlarged figures. iii) The teacher to guide students to locate the centre of enlargement by construction. iv) Students to solve problems related to locating the centre of enlargement	i) Mathematical sets ii) Graph papers iii) Geoboard iv) Rubber bands	Is the students able to construct enlargement of a given figures?	

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		(d) Draw figures to scale.	i) The teacher to guide students to discuss how to draw figures using a given scale. ii) Students to draw different figures to scale.	i) Mathematical sets ii) Maps	Is the students able to draw figures to scale?	
		(e) Find actual distances represented by a scale drawings.	i) The teacher to guide student to discuss how to calculate actual distances represented by a scale drawings. ii) Students to apply the properties of enlargement to solve related problems	Mathematical sets	Is the student able to find actual distances represented by a scale drawings?	
	7.5. Combined Transformations	The student should be able to: (a) Draw combined transformations	i) The teacher to guide student to draw combined transformations. ii) Students to draw combined transformations in a plane	Mathematical sets	Is the student able to draw combined transformations?	4

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		(b) Solve simple problems on combined transformations	i) The teacher to guide students in groups to solve problems on combined transformation. ii) Students to solve problems on combined transformations in a plane by construction.		Is the student able to solve simple problems on combined transformations?	
8.0 PYTHAGORAS THEOREM	8.1 Proof of Pythagoras Theorem	The students should be able to prove the Pythagoras theorem.	i) The teacher to guide students to investigate the illustration of Pythagoras theorem. ii) The teacher to guide students to prove the Pythagoras theorem. iii) Students to solve problems related to right angled triangles. iv) Students to solve problems related to right angled triangles	i) Geoboard ii) Square cuttings iii) Right angled triangles iv) Square root tables v) Square tables	Is the student able to prove the Pythagoras theorem?	4

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	8.2 Application of Pythagoras theorem	The student should be able to apply the Pythagoras theorem to solve daily life problems.	i) The teacher to guide students to discuss how to solve real life problems using Pythagoras theorem. ii) Students to solve real life problems using Pythagoras theorem.	i) Manila paper ii) Marker pens	Is the student able to apply the Pythagoras theorem to solve daily life problems?	4
9.0 TRIGONOMETRY	9.1 Trigonometric ratios	The student should be able to define sine, cosine and tangent of an angle using a right-angled triangle.	i) The teacher to guide students to brainstorm on indirect methods of finding distances e.g. width of river and height of a tree. ii) The teacher to guide students to draw similar right angled triangles given an angle and a side iii) Students to measure the sides of the triangles drawn and compare the ratio of sides to establish trigonometric ratios (sine, cosine and tangent).	i) Graph paper ii) Mathematical sets iii) Clinometers iv) Tape measure v) Rope vi) Treadle wheel vii) Trigonometric tables	Is the student able to define trigonometric ratios?	6

TOPIC	SUB-TOPICS	SPECIFIC OBJECTIVES	TEACHING AND LEARNING STRATEGIES	TEACHING AND LEARNING RESOURCES	ASSESSMENT	NUMBER OF PERIODS
			iv) Students to compute sines, cosines and tangents of rights angled triangles without tables.			
	9.2 Trigonometric Ratios of Special Angles	The student should be able to: (a) Determine the sine, cosine and tangent of 30^o, 45^o and 60^o without using Trigonometric tables.	i) The teacher to guide students to discuss the use of the right-angled triangle and the Pythagoras theorem to determine sine, cosine and tangent for 30^o,45^o and 60^o without using trigonometric tables ii) Students to find the sin, cos and tan for 30^o, 45^o and 60^o without using table.	Mathematical set	Is the student able to determine the sine, cosine and tangent of 30^o, 45^o and 60^o without using trigonometric tables?	6
		(b) Solve simple trigonometric problems related to special angles.	i) The teacher to guide students to do calculations involving special angle ratios. ii) Students in groups to do calculations involving sine, cosine and tangent for 30^o, 45^o and 60^o.	Trigonometric tables	Is the student able to perform calculations related to special angles?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	9.3 Trigonometric Tables	The students should be able to: (a) Read the trigonometric ratios from tables.	i) The teacher to guide the student to read sine, cosine and tangent for angles between 0^o and 90^o. ii) Students to read sine, cosine and tangents between 0^o and 90^o iii) The teacher to guide student to discuss how to use tables to find the angle representing a given trigonometric ratio. iv) Students to solve problems related to finding angles of given trigonometric ratios.	Trigonometric tables	Is the student able to read the trigonometric ratios using trigonometric tables?	5
		(b) Solve problems involving trigonometric ratios using trigonometric tables	i) The teacher to demonstrate how to use trigonometric tables to solve related problems. ii) Students in groups to do exercises involving trigonometric ratios	Trigonometric tables	Is the student able to use trigonometric tables to solve daily life problems?	

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	9.4 Angles of Elevation and Depression	The student should be able to: (a) Measure angles of elevation and angles of depression	i) The teacher to explain angles of elevation and depression using practical examples. ii) The teacher to guide students to measure angles of elevations and depressions using clinometers.	i) Trigonometric tables ii) Clinometers iii) Rope iv) Treadle wheel	Is the student able to measure angles of elevation and depressions?	6
		(b) Solve problems involving angles of elevation and angles of depression.	i) The teacher to guide students to discuss how to find angles of elevation and depression of distant objects e.g. height of trees, towers and building. ii) The teacher to guide students to discuss how to calculate the height given the distance to the object and the angle of elevation or depression.	i) Clinometers ii) Mathematical sets iii) Graph papers iv) Trigonometric tables v) Tape measure vi) Trundle wheel vii) Rope	Is the student able to solve problems involving angle of elevation and depression?	

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			iii) Students to solve problems using trigonometric ratios and trigonometric tables. iv) Students to solve problems in groups using scale drawing and present their work in class.			
10.0 SETS	10.1 Description of a set	The student should be able to (a) Define a set.	i) The teacher to use objects in the surrounding to explain the concept of a set. ii) Students to brainstorm on various sets in their surrounding	i) Real objects ii) Pictures	Is the student able to define set?	10
		(b) List the members of a set.	i) The teacher to show students set notation. ii) The teacher to show how to use the set notation. ii) Students to give some examples of a set from their surrounding and write them using set notation.	i) Playing cards ii) Teams of players iii) Real numbers iv) Animals	Is the student able to name and list the members of a given set?	

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		(c) Name a set.	i) The teacher to show students how to name sets. ii) Students to do exercises on naming different sets.	i) Card ii) Manila sheet	Is the student able to name a set properly?	
		(d) Describe sets by listing and by stating the members.	i) The teacher to demonstrate how to describe sets by words, listing and formula, ii) Students to solve questions involving set description by words, listing and formula.		Is the student able to describe sets by listing, stating or using formula?	
	10.2 Types of Sets	The students should be able to: (a) Define a universal set and an empty set.	i) The teacher to guide student to establish the concept of universal set and empty set. ii) Students to solve problems related to empty set and universal set	i) Playing cards ii) Teams of players iii) Real numbers iv) Dinner sets	Is the student able to define universal sets and an empty set?	6

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Distinguish between finite and infinite sets.	i) The teacher to guide students to compare finite and infinite sets. ii) Students to compare finite and infinite sets	i) Playing cards ii) Teams of players iii) Real numbers iv) Dinner set	Is the student able to distinguish between finite and infinite sets?	
		(c) Distinguish between equivalent and equal sets	i) The teacher to guide students to compare sets in order to determine equivalent and equal sets. ii) Students to compare equivalent and equal sets.	i) Playing cards ii) Teams of players iii) Real numbers iv) Dinner set	Is the student able to distinguish between equivalent and equal sets?	
	10.3 Subsets	The student should be able to: (a) Define a subset.	i) The teacher to guide students to use examples to form subsets ii) The teacher to guide students to define a subset. iii) Students to give examples of subsets in their surrounding	i) Playing cards ii) Teams iii) Real numbers iv) Dinner set	Is the student able to define a subset?	10

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		(b) List subsets of a given set	i) The teacher to guide students to discuss how subsets of a set can be listed. ii) Students in groups to do exercises on listing subsets of given sets.	i) Playing cards ii) Teams iii) Real numbers iv) Dinner set	Is the student able to list subsets of a given set?	
		(c) Distinguish between proper and improper subsets.	i) The teacher to guide students to discuss the meaning of proper and improper subsets using the listed subsets and the use of the symbols ii) Students to do exercises to differentiate proper and improper subsets.	i) Playing cards ii) Teams of players iii) Real numbers iv) Dinner set	Is the student able to distinguish between proper and improper subsets?	
		(d) Calculate the number of subsets in a set.	i) The teacher to lead students to discuss how to establish the number of subsets of a set with n members as 2^n. ii) Students to apply the formula 2^n to calculate the number of subsets for a set with n elements.	i) Playing cards ii) Teams of players iii) Real numbers iv) Dinner set	Is the student able to calculate the number of subsets in a set?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	10.4 Operations with Sets	The students should be able to: (a) Find union of two sets.	i) The teacher to guide students to use real life examples to discuss the union of two sets and the use of the symbol ∪. ii) The teacher to guide students to use real life examples to discuss the intersection of two sets and the use of the symbol ∩. iii) Students to do exercises involving the union and intersection of two sets. iv) The teacher to guide students to play games on union and intersection of sets.	i) Teams ii) Games iii) Objects iv) Playing cards v) Teams of vi) Players vii) Games viii) Objects ix) Playing cards	Is the student able to find union and intersection of sets?	6
		b) Find the compliment of a set.	i) The teacher to guide students to discuss how to find the compliment of a set given a universal set.	i) Venn diagram ii) Real objects iii) Flip charts iv) Coloured chalks	Is the student able to find the compliment of a set?	

TOPIC	SUB-TOPICS	SPECIFIC OBJECTIVES	TEACHING AND LEARNING STRATEGIES	TEACHING AND LEARNING RESOURCES	ASSESSMENT	NUMBER OF PERIODS
			ii) Students to do exercises involving the compliment of sets			
		(c) Find the number of elements in the union and intersection of two sets.	i) The teacher to guide students to derive the formul $n(A \cup B) = n(A) + n(B) - n(A \cap B)$ ii) Students individually to apply the formula to solve related problems		Is the student able to find the number of elements in the union and intersection of sets?	
	10.5 Venn Diagrams	The student should be able to: (a) Represent a set by using Venn diagrams.	i) The teacher to illustrate how to represent sets using Venn diagrams. ii) Students to represent sets by Venn diagrams.	i) Venn diagrams ii) Real objects iii) Coloured chalks	Is the student able to represent sets by using Venn diagrams?	8
		(b) Solve problems on a set by using Venn diagrams.	i) The teacher to guide students to use Venn diagrams in solving simple problems involving operations with two sets. ii) Students to solve problems involving at most two sets using Venn diagram.	i) Venn diagrams ii) Teams of players	Is the student able to solve the problems on sets by using Venn diagrams?	

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		(c) Interpret information from Venn diagrams.	i) Students to solve word problems involving operations on sets, compliment of sets and Venn diagrams. ii) The teacher to guide students to extract information from Venn diagrams.	i) Venn diagrams ii) Coloured chalks iii) Manila paper iv) Marker pens	Is the student able to interpret information from Venn diagrams?	
11.0 STATISTICS	11.1 Pictograms	The student should be able to: (a) Display information by pictograms.	i) The teacher to guide students to collect data e.g. classroom, attendance, students, ages, heights and weight, school enrolment, size of students, favorite drinks, waist measurements. ii) Students to collect raw data iii) The teacher to discuss with students how to represent data by pictograms iii) Students to represent data by using pictograms.	i) Graph paper ii) Mathematical set iii) Objects iv) Geoboard v) Rubber bands	Is the student able to display information by pictograms?	4

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Interpret pictograms	i) The teacher to discuss with students how to interpret pictograms involving real situation in their surroundings. ii) Students in groups to do exercises involving interpretation of pictograms	i) Tape measure ii) Weighing scales iii) Class journals iv) Enrolment v) Register	Is the student able to extract information from a pictograms?	
	11.2 Bar Charts	The student should be able to: (a) Draw horizontal and vertical bar charts.	i) The teacher to show students how to draw bar charts using data such as a class attendance HIV/AIDS death rates, cash crops and school enrolments. ii) Students to draw bar charts using collected data	i) Graph papers ii) Mathematical instruments	Is the student able to draw horizontal and vertical bar charts?	4
		(b) Interpret bar charts.	i) The teacher to guide a discussion on how to extract information from bar charts. ii) Students in groups to do many exercises on interpretation of bar charts and conduct peer presentations.	i) Graph paper ii) Mathematical instruments iii) Geoboard iv) Rubber bands	Is the student able to extract information from bar charts?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	11.3 Line Graphs	The students should be able to: (a) Represent data using line graphs	i) The teacher to show students how to draw line graphs using data from different sources. ii) Students to draw line graphs using continuous data such as temperatures and heights.	i) Graph papers ii) Graph board iii) Geoboard iv) Extracts from newspapers. v) Rubber bands	Is the student able to represent data using line graphs?	4
		(b) Interpret line graphs.	i) The teacher to guide students to discuss how to interpret data from the line graphs. ii) Students to interpret information from line graphs	Line graphs	Is the student able to interpret data from line graphs correctly?	
	11.4 Pie Chart	The student should be able to (a) Display data using pie charts.	i) The teacher to guide students to calculate angles of each sector in a pie chart ii) The teacher to demonstrate how to draw a pie chart using a pair of compasses and a protractor.	i) Coloured chalks ii) Ruler iii) Protractor iv) A pair of compasses v) Coloured pencils	Is the student able to display data using pie-charts?	4

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iii) Students to practice representing data or information on a pie chart			
		(b) Interpret pie charts.	i) The teacher to guide students to discuss how to interpret data from the pie charts. ii) Students to interpret information from pie charts	Pie charts	Is the student able to interpret data from pie chart correctly?	
	11.5 Frequency Distribution Tables	The student should be able to: (a) Make frequency distribution tables from raw data.	i) The teacher to show students how to represent data/ information using frequency distribution tables with single values and with grouped values. ii) Students to practice on how to represent data using frequency distribution tables	Collected data	Is the student able to make a frequency distribution table from raw data?	4

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Interpret frequency distribution tables.	i) The teacher to guide students to discuss how to interpret frequency distribution tables. ii) Students to do exercises involving interpretation of frequency distribution tables	Collected data	Is the student able to interpret frequency distribution tables?	
	11.6 Frequency Polygons	The student should be able to: (a) Draw frequency polygons from frequency distribution tables.	i) The teacher to demonstrate how to draw frequency polygons using frequency distribution tables. ii) Students to practice drawing frequency polygons to represent data.	i) Graph paper ii) Mathematical set iii) Collected data	Is the student able to represent data using frequency polygons?	4
		(b) Interpret frequency polygons	i) The teacher to guide students to interpret frequency polygons. ii) Students in groups to do exercises on interpreting frequency polygons	Frequency polygons	Is the student able to interpret frequency polygons correctly?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	11.7 Histograms	The students should be able to: (a) Draw histograms from frequency distribution table.	i) The teacher to guide students to draw histograms using set of data and frequency distribution tables. ii) Students to drawing histograms using data and frequency distribution tables	i) Geoboard ii) Graph paper iii) Collected data iv) Mathematical set v) Rubber bands	Is the student able to draw histograms from a set of data and a frequency distribution table?	4
		(b) Interpret histograms	i) The teacher to guide students to reduce information from histograms. ii) Students to do exercises on interpretation of histograms	Histograms	Is the student able to extract correct information from histograms?	
	11.8 Cumulative Frequency Curves	The student should be able to: (a) Draw cumulative frequency curve from a cumulative frequency distribution table.	i) The teacher to demonstrate how to construct cumulative frequency distribution tables from frequency distribution tables. ii) The teacher to guide students to draw a cumulative frequency curve by using a cumulative frequency distribution table.	i) Graph paper ii) Mathematical	Is the student able to draw cumulative frequency curve from a frequency table?	4

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iii) Students to do exercises involving drawing cumulative frequency curves			
		(b) Interpret a cumulative frequency curve.	i) The teacher to guide students to deduce information from cumulative frequency distribution table and a cumulative frequency curve. ii) Students in group to interpret cumulative frequency distribution tables and cumulative frequency curves	i) Graph paper ii) Graphs from papers and journals	Is the student able to interpret a cumulative frequency curve?	

FORM THREE

CLASS LEVEL COMPETENCES

Student should have the ability to:

1. Use Mathematical knowledge, skills and concepts in solving real life related problems.
2. Analyse and interpret statistical data.
3. Generate sequences and series.
4. Prove circle theorems.
5. Prepare simple trading account.
6. Draw graphs.

CLASS LEVEL OBJECTIVES

By the end of Form Three course the student should be able to:

1. Apply the knowledge on rates and variation in real life situations
2. Locate places on the earth's surface and find the distance between any two places.
3. Represent data statistically and draw conclusions from numerical statistical information (mean, mode and medium).
4. Apply computations on sequences and series to discover mathematical patterns and solve problems on compound interest.
5. Draw graphs of relations and functions and identify their properties
6. Prove and apply circle theorems
7. Solve real life problems involving double entry and trial balance.

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
1.0 RELATIONS	1.1 Relations	The students should be able to: (a) Find relations between two sets.	i) The teacher to guide students to brainstorm on various relations involving two groups in real life situations. ii) The teacher to prepare guide lines for a role play. iii) Students to perform a role play in order to define the relations.	i) Coloured chalks ii) Real objects	Is the student able to find relations between two sets?	8
		(b) Find relations between members in a set.	i) The teacher to guide students to brainstorm on various relations between members of two sets in real life situation. ii) The teacher to demonstrate how to use a relation notation to represent a relation. iii) Students to practice on how to represent a relation using relations notation iv) Students to perform role play in order to define members of two sets	i) Coloured chalks ii) Manila paper iii) Marker pens iv) Real objects	i) Is the student able to find relations between members in a set? ii) Is the student able to write relations using notations?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(c) Demonstrate relations pictorially	i) The teacher to demonstrate how to draw arrows to relate members of sets in a relation. ii) Students to illustrate relations by pictorial presentations.	i) Coloured chalks ii) Manila paper iii) Marker pens	Is the student able demonstrate relations pictorially?	
	1.2 Graph of a Relation	The student should be able to draw a graph of a relation represented by a linear inequality.	i) The teacher to guide students through questions and answers to plot a graph of a relation in the coordinate system. ii) Students in groups to draw a graph of a linear inequality iii) Students individually to draw graphs of linear inequalities.	i) Graph-papers ii) Mathematical instruments iii) Squared papers iv) Graphs board v) Geoboard vi) Rubber bands	Is the student able to draw the graph of a relation?	6
	1.3 Domain and Range of a Relation	The student should be able to: (a) State the domain of a relation.	i) The teacher to guide students to show the domain of a relation by using pictorial representation. ii) Students to show and state the domain from graphs and pictorial representation.	i) Coloured chalks ii) Graph papers iii) Graph board iv) Geoboard v) Squared paper vi) Rubber bands	Is the student able to state the domain of a relation?	6

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iii) Students to do exercises related to domain of relation			
		(b) State the range of a relation.	i) The teacher to guide students to show the range of a relation from graphs and pictorial representation. ii) Students individually to find and state the range of a relation from pictorial representations and graphs. iii) Students to solve problems related to range of a relation.	i) Graphs ii) Illustrations of relations iii) Rubber bands iv) Manila paper v) Marker pens.	Is the student able to state the range of a relation?	
	1.4 Inverse of a Relation	The student should be able to: (a) Explain the inverse of a relation.	i) The teacher through questions and answers to guide a discussion on the inverse of a relation and the use of the inverse notation ii) Students individually to explain the inverse of relations using the inverse notation	i) Graph paper ii) Illustrations of relations iii) Squared paper iv) Geoboard v) Rubber bands	Is the student able to explain the inverse of a relation?	10

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Show the inverse of a relation pictorially.	i) The teacher to show students the inverse of a relation by using pictures. ii) Students in groups to practice on showing the inverse of a relation pictorially	i) Coloured chalks ii) Illustration of relations iii) Manila paper iv) Marker pens	Is the student able to show the inverse of a relation pictorially?	
		(c) Find the inverse of a relation.	i) The teacher to guide the students in finding the inverse of a relation. ii) Students individually to solve problems which involve the inverse of relation in real life situations.	i) Coloured chalks ii) Illustrations of relations iii) Manila paper iv) Marker pens	Is the student able to find the inverse of a relation?	
		(d) Draw a graph of the inverse of a relation.	i) The teacher to demonstrate how to draw the graph of the inverse of a relation ii) Students in groups to draw the inverse of a relation iii) Students individually to draw graphs of the inverse of relations	i) Graph paper ii) Graph board iii) Mathematical instrument iv) Coloured chalk v) Geoboard vi) Squared paper	Is the student able to draw the graph of the inverse of a relation?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
2.0 FUNCTIONS	2.1 Representation of a function	The student should be able to: (a) Explain the concept of a function.	i) The teacher to guide students through questions and answers to discuss the concept of a function. ii) The teacher to demonstrate how to use function notation to represent a function. iii) Students individually to solve problems related to the concept of a function and the use	i) Rubber bands ii) Manila paper iii) Marker pens	Is the student able to explain concept of the function?	**8**
		(b) Represent functions pictorially.	i) The teacher to demonstrate how to represent functions pictorially. ii) Students individually to represent functions pictorially.	i) Coloured chalks ii) Pictures/ illustrations of functions	Is the student able to illustrate functions pictorially?	
		(c) Identify functions among relations	i) The teacher to guide students through questions and answers to discuss conditions for a relation to be a function	i) Pictures and illustrations ii) Graphs iii) Manila paper iv) Marker pens	Is the student able to identify functions among relations ?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			ii) Students in groups to identify functions among relations.			
	2.2 Domain and Range of a Function	The student should be able to: (a) State the domain of a function	i) The teacher, through question and answers to guide a discussion on identifying the domain of functions. ii) Students to do exercises relating to the domain of functions.	i) Illustrations of functions ii) Coloured chalks iii) Manila paper iv) Marker pens	Is the student able to state the domain of a function?	6
		(b) State the range of a function	i) The teacher through questions and answers, to guide a discussion on the range of functions. ii) Student to do exercises relating to the range of functions.	i) Illustrations of functions ii) Coloured chalks iii) Manila paper iv) Marker pens	Is the student able to state the range of a function?	
	2.3 Graphic function	The student should be able to draw graphs of functions.	i) The teacher to guide students to draw the graphs of step functions and polynomial functions up to the third degree.	i) Graph paper ii) Mathematical instruments iii) Coloured chalks iv) Squared paper	Is the student able to draw graph of the functions?	6

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			ii) Students to draw the graphs of step functions and polynomial functions up to the third degree. iii) The teacher to guide students to discuss the behavior of graphs of functions. iv) Students to state the behavior of graphs of functions.			
	2.4 Inverse of a Function	The student should be able to: (a) Explain the inverse of a function.	i) The teacher to explain the inverse of functions and the use of the inverse function notation. ii) Students to do exercises involving inverse of functions.	i) Graphs ii) Pictures or illustrations of functions iii) Coloured chalks iv) Manila paper	Is the student able to explain the inverse of a function?	12
		(b) Show the inverse of a function pictorially.	i) The teacher to guide students to show the inverse of a function pictorially ii) Students to explain the behavior of pictures of inverses of one to one functions.	i) Coloured chalks ii) Illustration of a function iii) Manila paper iv) Marker pens	Is the student able to illustrate inverse functions pictorially?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iii) Students to draw pictures of inverse functions.			
		(c) Find the inverse of a function.	i) The teacher to guide students to find the inverse of a function ii) Students in groups to find the inverse of functions iii) Students to present group work on inverse functions iv) Students to solve problems involving inverse of functions in real life situation	i) Coloured chalks ii) Geoboard iii) Graph papers iv) Squared paper v) Rubber bands	Is the student able to find the inverse of a function?	
		(d) Draw a graph of the inverse of a function.	i) The teacher to demonstrate how to draw the graph of the inverse of a function. ii) Students in groups to draw graphs of inverse of functions. iii) Student to present group work on graphs and discuss their properties.	i) Graph papers/ board ii) Squared paper iii) Geoboard iv) Rubber bands	Is the student able to draw graphs of inverse functions?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iv) Students individually to draw the graph of inverse of a function.			
		(e) State the domain and range of inverse of functions.	i) Students in groups to discuss the concept of domain and range of inverse functions. ii) The teacher to guide students to state domain and range of inverse functions from pictorial representations and graphs. iii) Students to solve problems on identifying and stating the domain and range of inverse functions.	i) Graphs ii) Pictorial illustrations of functions iii) Marker pens iv) Manila paper	Is the student able to state the domain and range of inverse of functions?	
3.0 STATISTICS	3.1 Mean	The student should be able to: (a) Calculate the mean from a set of data, frequency distribution table and histogram.	i) The teacher to guide students to obtain statistical data such as HIV/ AIDS, Road Safety Education, Child Labour and Gender ii) The teacher to guide the students to use	i) Graph paper ii) Squared paper iii) Squared boards/ papers iv) Geoboard v) Rubber bands vi) Calculators	Is the student able to calculate the mean from a set of data from a frequency distribution table and histogram?	8

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			the data obtained to explain the concept of mean. iii) The teacher to guide students to calculate the mean from frequency distribution for ungrouped and grouped data iv) Students to calculate the mean given frequency distribution tables. v) The teacher to guide students to calculate the mean from histograms vi) Students to calculate the mean from histograms. (vii) Students to compare the mean obtain from data, frequency distribution tables and histogram. (viii)Students to calculate the mean using data from real life situation	Chart with data of H I V/ A I DS road safety education , child labour, gender		

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Interpret the mean obtained from a set of data, frequency distribution tables and histogram.	i) Students in groups to interpret the mean obtained from statistical data on HIV/AIDS, Road safety education, child labour, gender. ii) Students to compare the mean obtained from raw data, frequency distributions and histograms. iii) Each group to present their findings in class. iv) The teacher to lead the discussion after the presentation.	Chart with statistical reports on HIV/ AIDS, gender, road safety education, environment, child labour.	Is the student able to interpret the mean?	
	3.2 Median	The student should be able to: (a) Explain the concept of median.	i) The teacher to guide students to use the data obtained to explain the concept of median ii) Students to identify and state the median from raw statistical data.	i) Graph papers ii) Graph board iii) Squared paper iv) Geometrical instruments	Is the student able to explain the concept of median?	10

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Calculate the median from a set of data.	i) The teacher to guide students to calculate the median from ungrouped data. ii) Students to solve problems involving calculating the median from ungrouped data	Chart with statistical data	Is the student able to calculate the median from ungrouped data?	
		(c) Find the median using frequency distribution tables and cumulative curve.	i) The teacher to guide students to estimate the median from frequency distribution tables and cumulative curve. ii) Students in groups to find the median using frequency distribution tables of single and grouped data and cumulative curve. iii) Students to present their work in class iv) The teacher to guide the discussion on the group presentation.	i) Graph paper ii) Squared paper iii) Graph board iv) Geoboard v) Rubber bands vi) Coloured chalks	Is the student able to find the median using frequency distribution table and cumulative curve?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(d) Interpret the median obtained from the data.	i) Students in groups to interpret the median obtained from the statistical data ii) The teacher to guide students to present their group work in class iii) Students individually to solve problems involving median	i) Graphs ii) Charts with statistical data on HIV/AIDS, road safety education, gender, environment, child labour iii) Graph paper/board	Is the student able to interpret the median?	
	3.3 Mode	The student should be able to: (a) Explain the concept of mode.	i) The teacher to guide students to use statistical data obtained to explain the concept of mode. ii) Students to identify and state the mode from statistical data	Chart with different statistical data	Is the student able to explain the concept of mode?	**12**
		(b) Calculate the mode.	i) The teacher to guide students to calculate the mode from a set of data ii) Students to calculate the mode from grouped data	i) Squared paper ii) Geoboard iii) Coloured chalks iv) Graph paper/ board v) Rubber bands	Is the student able to calculate the mode and modal class from a set of data?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iii) The teacher to guide students to identify the modal class iv) Students to use modal class to estimate the mode.			
		(c) Find the mode using frequency distribution table and a histogram.	i) The teacher to guide students to estimate the mode from a histogram and a frequency distribution table. ii) Students in groups to find the mode from frequency distribution tables and histograms.	i) Squared paper ii) Geoboard iii) Coloured chalks iv) Rubber bands v) Manila paper vi) Marker pens vii) Graph paper	Is the student able to find the mode using a frequency distribution table and histogram?	
		(d) Interpret the mode obtained from the data	i) Students in groups to interpret the mode obtained from a set of data, distributions and histograms. ii) Students individually to solve problems involving the mode and modal-class.	i) Statistical graph ii) Charts with statistical data	Is the student able to interpret the mode?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
4.0 RATES AND VARIATIONS	4.1 Rates	The students should be able to: (a) Relate rates of quantities of different kinds.	i) The teacher to guide students to discuss the different kinds of rates in order to relate quantities. ii) Students to solve problems on different kinds of rates.	Objects of different kinds	Is the student able to relate quantities of different kinds?	**8**
		(b) Relate quantities of the same kind.	i) The teacher to guide students to discuss the same kind of rates in order to relate quantities.	i) Different currencies ii) Objects of the same kind	Is the student able to relate quantities of the same kind?	
		(c) Convert Tanzanian currency into other currencies.	i) The teacher and students to obtain currency conversion rates from newspapers, magazines, radio, TV, banks, post office. ii) The teacher to guide students to collect different currencies iii) The teacher to show students how to convert Tanzanian shillings into other currencies and vice versa	i) Newspapers ii) Magazines iii) Television iv) Radio v) Different currencies	Is the student able to convert Tanzanian currency into other currencies?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iv) Students to convert Tanzanian shillings to other currencies and vice versa.			
	4.2 Variation	The student should be able to: (a) Explain the concept of direct variation.	i) The teacher to guide students to discuss things which vary directly. ii) The teacher to guide students to write direct proportion in symbolic form iii) Students to use the symbol of direct proportion in writing proportions.	i) Manila paper ii) Marker pens iii) Physical objects	Is the student able to explain the concept of direct variation?	**20**
		(b) Solve problems on direct variation.	i) The teacher to guide students in forming and solving equations from direct variation ii) Students to solve questions from direct variation	Physical objects	Is the student able to solve problems on direct variation?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(c) Draw graphs of direct variation.	i) The teacher through questions and answers to guide students to draw graphs of direct variations. ii) Students to draw graphs of direct variations iii) The teacher to guide students to discuss the behavior of the graphs of direct variations	i) Graph papers/ board ii) Mathematical instruments iii) Coloured chalks iv) Geoboard v) Rubber bands	Is the student able to draw graphs of direct variations?	
		(d) Explain the concept of inverse variation.	i) The teacher to guide students to discuss things which vary inversely. ii) The teacher to guide students to write inverse proportions in symbolic form iii) Students to use the symbols α to write inverses proportions	i) Physical objects ii) Manila paper iii) Marker pens	Is the student able to explain the concept of inverse variation?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(e) Solve problems on inverse variations.	i) The teacher to guide students to form and solve equations from inverse variations. ii) Students individually to draw graphs of inverse variations.	i) Manila paper ii) Marker pens	Is the student able to solve problems on inverse variations?	
		(f) Draw graphs relating inverse variations.	i) The teacher to guide students through questions and answers, to draw graphs of inverse variations. ii) Students individually to draw graphs of inverse variations and state their behavior.	i) Graph paper ii) Mathematical instruments iii) Coloured chalks	Is the student able to draw graphs relating inverse variation?	
		(g) Use joint variation in solving problems.	i) The teacher to guide students to discuss joint variation as a quantity which varies jointly with two or more variables. ii) The teacher to guide students in forming and solving equations from joint variations iii) Students to solve questions from joint variations.	i) Squared paper ii) Geoboard iii) Rubber bands iv) Graph board	Is the student able to use joint variation in solving problem?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
5.0 SEQUENCES AND SERIES	5.1 Sequences	The student should be able to : (a) Explain the concept of sequence.	i) The teacher to guide students to discuss the concept of a sequence ii) Students to extend terms of given sequences. iii) The teacher to guide students to find n^{th} the term of a sequence. iv) Students individually to n^{th} solve problems on the term of a sequences.	i) Number cards ii) Number patterns in ascending and descending order iii) Mathematical tables iv) Scientific pockets v) Calculators vi) Coloured chalks	i) Is the student able to explain the concept of a sequence? ii) Is the student able to find the n^{th} term of a sequence?	**12**
		(b) Identify an arithmetic progression (AP) and geometric progression (GP).	i) The teacher to guide students to discuss the meaning of A.P and G.P. ii) The teacher to guide students in groups to identity AP and GP from other sequences iii) Students individually to solve problems distinguishing AP's and GP's	i) Number cards ii) Coloured chalks iii) Mathematical tables iv) Scientific pocket v) Calculators	Is the student able to identify an arithmetic progression and geometric progression?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(c) Find the general term of an AP.	i) The teacher to guide students to derive the formula for the general term of an A.P. ii) Students to use the ninth term formula to solve problems.	Coloured chalks	Is the student able to find the general term of an arithmetic progression?	
		(d) Find the general term of a GP.	i) The teacher to guide students to derive the formula to find the general term of a GP ii) Students to use the formula for the n^{th} term of a GP to solve problems	i) Mathematical tables ii) Manila paper\ iii) Marker pens iv) Scientific pocket calculators	Is the student able to find the general term of a geometric progression?	
	5.2 Series	The student should be able to: (a) Derive the formula for a sum of an arithmetic progression.	i) The teacher to guide students to discuss the concept of a series ii) The teacher to guide students to derive the formula of sum of A.P iii) Students individually to solve problems using formula for the sum of an AP.	i) Scientific pocket calculators ii) Mathematical tables	i) Is the student able to derive the formula of sum of an arithmetic progression? ii) Is the student able to solve problems related to the sum of an AP?	**12**

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Calculate the arithmetic mean.	i) The teacher to guide students to discuss how to find the arithmetic mean. ii) The teacher to guide students to derive the formula for the arithmetic mean iii) Students individually to use arithmetic mean formula to solve problems	Coloured chalk	Is the student able to calculate the arithmetic mean?	
		(c) Derive the formula for the sum of a geometric progression.	i) The teacher to guide students to derive the formula for the sum of a GP ii) The teacher to guide students in groups to solve problems using the formula of the sum of G.P iii) Students individually to solve problems using the formula for the sum of a GP.	i) Coloured chalk ii) Mathematical tables iii) Scientifi pocket calculators	i) Is the student able to derive the formula for the sum of a geometric progression? ii) Is the student able to find the sum of a GP?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(d) Calculate the geometric mean.	i) The teacher to guide students to derive the formula for the geometric mean ii) Students to use the geometric mean iii) Students to use the geometric mean formula to solve problems	i) Mathematical tables ii) Scientific pocket calculators	Is the student able to calculate the geometric mean?	
	5.3 Compound Interest	The student should be able to calculate compound interest using formula.	i) The teacher to guide students to discuss the meaning of compound interest. ii) The teacher to guide students to derive the compound interest formula using the knowledge obtained from the G.P series iii) Students to do calculations using the compound interest formula	i) Mathematical tables ii) Scientific pockets calculators	Is the student able to calculate the compound interest using formula?	**3**

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
6.0 CIRCLES	6.1 Definition of Terms	The student should be able to define different terms of circles.	i) The teacher to guide students to brainstorm on the meaning of circle, chord, radius, diameter, circumference, arc, centre, sector and segment of a circle. ii) Students individually to synthesize the responses into meanings of the terms. iii) The teacher to guide students to discuss application of circles in daily life.	i) Compasses ii) Ruler iii) Coloured chalks	Is the student able to define different terms of circles?	**3**
	6.2 Central Angle	The student should be able to: (a) Derive the formula for the length of an arc.	i) The teacher to demonstrate the central angle by using a diagram ii) The teacher to guide students to discuss the relationship between central angle and the arc it intercepts iii) The teacher to guide students to derive the formula for the length of an arc.	i) Coloured chalks ii) Ruler iii) Protractor iv) Compasses	i) Is the student able to derive the formula for the length of an arc? ii) Is the student able to apply the formula for the length of an arc in solving problems?	**10**

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iv) Students in groups to solve problems related to the formula for the length of an arc. v) Students to present their work in class for evaluation.			
		(b) Calculate the central angle.	i) The teacher to guide students to find the measure of the central angle using the formula. ii) Students individually to calculate the central angle in different real life situations using the formula.	i) Compasses ii) Coloured chalks iii) Ruler	Is the student able to calculate the central angle?	
		(c) Explain the concept of radian measure.	i) The teacher to demonstrate the radian measure. ii) The teacher to guide students to discuss the meaning of radian measure. iii) Students to estimate the radian measure by measuring different cylinders or circles.	i) Thread ii) Compasses iii) Ruler iv) Protractor v) Cylinders	Is the student able to explain the concept of radian measure?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(d) Convert radians to degrees and vice versa.	i) The teacher to guide students to discuss how to convert radians to degrees and degrees to radians. ii) Students to solve problems on converting radians to degrees and vice versa.	i) Mathematical tables ii) Scientific pocket calculators iii) Manila paper iv) Marker pens	Is the student able to convert radians to degrees and vice versa?	
	6.3 Angles Properties	The student should be able to: (a) Prove circle theorems of inscribed angles	i) The teacher to guide students to discuss the meaning of an inscribed angle. ii) The teacher to guide students to prove the theorem "The angle which an arc subtends at the center is double that which it subtends at any point on the remaining part of the circumference". iii) Students in groups to solve problems related to the theorem	i) Compasses ii) Rulers iii) Coloured chalks iv) Manila paper v) Marker pens	Is the student able to prove the circle theorems of inscribed angle?	**10**

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iv) The teacher to guide students to prove the theorem "Angles in the same segment of a circle are equal". v) Students in groups to solve problems related to the theorem vi) The teacher to guide students to prove the theorem" The angle subtended in a semicircle is a right angle". vii)Students in groups to solve problems related to the theorem. viii) The teacher to guide students to prove the theorem "The opposite angles of a cyclic quadrilateral are supplementary" ix) Students in groups to solve problems related to the theorem.			

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Apply the circle theorems in solving related problems.	i) The teacher to guide students to solve problems involving the four angle theorems. ii) Students individually to use the circle theorems in solving problems involving all the four angle theorems	i) Compasses ii) Ruler	Is the student able to apply the circle theorems in solving related problems?	
	6.4 Chord Properties of a Circle	The student should be able to: (a) Identify chord properties of a circle.	i) The teacher to guide students to discuss the chord properties of a circle using diagrams. ii) Students individually to state chord properties of a circle	i) Compasses ii) Ruler iii) Coloured chalks iv) Set square v) Manila papers vi) Marker pens	Is the student able to identify chord properties of a circle?	**9**
		(b) Prove the theorem on the perpendicular bisector to a chord.	i) The teacher to guide students to discuss the proof of the theorem on the perpendicular bisector of a chord. ii) The teacher to guide students to use the theorem on the perpendicular bisector of chord to solve related problems.	i) Compasses ii) Ruler iii) Coloured chalks iv) Set square v) Manila papers vi) Marker pens	i) Is the student able to prove the theorem on the perpendicular bisector of the chord ii) Is the student able to solve problem related to the	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iii) Students to solve problems related to the perpendicular bisector of a chord		perpendicular bisector of a chord?	
		(c) Prove the theorem on parallel chords.	i) The teacher to guide students to prove the theorem " parallel chords intercept congruent arcs" ii) The teacher to guide students in groups to use the theorem on parallel chords to solve related problems. iii) Students to present their group work in class for evaluation. iv) Students individually to solve problems on parallel chords	i) Compasses ii) Ruler iii) Coloured chalks iv) Set square v) Manila papers vi) Marker pens	i) Is the student able to prove the theorem on parallel chords? ii) Is the student able to solve problem relating parallel chords?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(d)Apply the theorems on chords in solving related problems.	i) The teacher to guide students to use the chord theorems to solve related problems in group. ii) Students to present their group work in class. iii) Students to solve problems on chord theorems individually.	i) Compasses ii) Ruler iii) Set square	Is the student able to apply chord properties and theorems to solve problems?	
	6.5 Tangent Properties	The student should be able to: (a) Describe a tangent to a circle.	i) The teacher to illustrate a tangent to a circle using diagrams ii) Students to draw different tangents to the given circle	i) Mathematical instruments ii) Manila paper iii) Marker pens	i) Is the student able to describe a tangent to a circle? ii) Is the student able to draw a tangent to a circle?	**12**
		(b) Identify tangent properties of a circle.	i) The teacher to guide students to discuss the tangent properties using diagrams ii) Students to list tangent properties of a circle	i) Ruler ii) Compasses iii) Coloured chalks	Is the student able to identify tangent properties of a circle?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(c) Prove tangent theorems.	i) The teacher to guide students to prove the theorem " Two tangents from an external point to a circle are equal". ii) Students in groups to solve problems related to tangents from an external points to a circle iii) Students to do individual work on tangents from an external point to a circle iv) The teacher to guide students to prove the theorem "Alternate segment theorem" v) Students in groups to solve problems related on the alternate segment theorem. vi) Students to do individual work on the alternate segment theorem.	i) Set square ii) Compasses iii) Manila paper iv) Marker pens	Is the student able prove tangent theorems?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(d) Apply theorems relating to tangent to a circle in solving problems.	i) The teacher to guide students to use tangent theorems in solving related problems. ii) Students to solve problems related to tangents to a circle.	Mathematical instruments	Is the student able to apply theorems related to tangents to a circle in solving problems?	
7.0 THE EARTH AS A SPHERE	7.1 Features an Location of Places	The student should be able to: (a) Describe the equator, great circles, small circles, meridian, latitudes and longitudes.	i) The teacher to guide students to discuss the meaning of the Equator, meridian, latitudes, longitudes, great circles and small circles on a globe. ii) The students to draw diagrams showing the Equator, meridian, latitudes and longitudes.	i) Globe ii) Oranges iii) Water melon iv) Models of a skeleton sphere and soft grass v) Atlas vi) Coloured Chalks' vii) Graphs papers	Is the student able to describe the equator, great circles, small circles, meridian, latitude and longitude?	**6**
		(b) Locate a place on the earth's surface.	i) The teacher to illustrate how to locate a place on a globe. ii) The teacher to guide students to locate places along the Equator, the Greenwich meridian, latitudes and longitudes.	i) Globe ii) Atlas iii) Coloured chalks iv) Graph papers	Is the student able to locate a place on the earth's surface?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iii) Students to locate places along the Equator and the Greenwich in groups. iv) The teacher to guide students to find the place on the globe given its latitude and longitude. v) Students to find places on the globe.			
	7.2 Distances Along Great Circles	The students should be able to: (a) Calculate distances along great circles.	i) The teacher to guide students to calculate distances along great circles ii) Students in groups to find distances along great circles iii) Students to present their work in class iv) Students to calculate the distances between two places along great circles	i) Magnetic compass ii) Compasses iii) Ruler iv) Thread v) Protractor	Is the student able to calculate the distance along great circles?	**6**

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Solve navigation related problems.	i) The teacher to guide students in solving navigation related problems ii) Students in groups to calculate navigation related problems using scale drawing and Pythagoras theorem. iii) Students to presents their group work in the class. iv) Students to do individual work on navigation problems by scale drawing.	i) Protractor ii) Mathematical tables iii) Navigation compasses iv) Gyroscope	Is the student able to solve navigation problems?	
	7.3 Distances along small circles	The students should be able to calculate distances along small circles.	i) The teacher to guide students to find the general formula for radius of small circles. ii) The teacher to guide students to discuss how to find the distance along small circles iii) The teacher to guide students in groups to find distance along small circles	i) Water melon ii) Oranges iii) Compasses iv) Coloured Chalks v) Models made of straws, wires or soft grass vi) Globe vii) Manila papers viii) Marker pens	Is the student able to calculate the distances along small circles?	**8**

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iv) Students to solve problems using the formula for the radius of a small circle v) Students to find the distance between two points on the same latitude.			
8.0 ACCOUNTS	8.1 Double Entry	The students should be able to: (a) Explain the meaning of double entry.	i) The teacher to guide students to discuss the principles of double entry system using real life examples ii) The teacher to demonstrate accounts showing the debit side and the credit side iii) Students to construct and label the credit and debit side iv) Students to explain the meaning of double entry	i) Ruler ii) Different ledger books	i) Is the student able to explain the meaning of double entry? ii) Is the student able to construct and label the credit and debit accounts?	**10**

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Describe different types of ledger.	i) The teacher to display different types of ledgers and ask students explain the meaning of ledger ii) The teacher to lead students to explain different types of ledgers such as cash account, capital, purchases, sales, expenses and stock iii) Students to distinguish different types of ledgers	Different types of ledgers	Is the student able to describe different types of ledgers?	
		(c) Construct a ledger.	i) The teacher to guide students to discuss how to qualify and label credit and debit account ii) Students to construct and qualify the debit and credit account	i) Ledger books ii) Coloured chalks	Is the student able to construct a ledger?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(d) Post entries in the ledger.	i) The teacher to demonstrate how to post entries in the ledger ii) The teacher to organize the students in small groups to post entries in the ledger	i) Ledger ii) Coloured chalks iii) Samples of vouchers	Is the student able to post entries in the ledger?	
		(e) Close the simple accounts	i) The teacher to guide students to close accounts ii) Students to exercise on closing accounts	Ledger books	Is the student able to close the simple accounts?	
	8.2 Trial Balance	The students should be able to: (a) Explain the concept of trial balance.	i) The teacher to lead students to discuss the meaning of a trial balance ii) Students to discuss the use of a trial balance iii) Students to explain the concept of trial balance	Ledger books	Is the student able to explain the concept of trial balance?	**12**

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Construct trial balance.	i) The teacher to demonstrate how to construct and qualify a trial balance ii) The teacher to guide students to do exercises on constructing and qualifying a trial balance	i) Calculators ii) Balance sheet	Is the student able to construct a trial balance ?	
		(c) Post debit balances and credit balances.	i) The teacher to demonstrate to students how to post debit balances and credit balances ii) Students in groups to do exercises on posting debit balances and credit balances	i) Ledger books ii) Samples of reposts on business transactions	Is the student able to post debit balances and credit balances ?	
		(d) Check the balances.	i) The teacher to guide students to check the balances. ii) Students individually to do exercises on checking the balances	Ledger books	Is the student able to check the balances?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	8.3 Trading Profit and Loss	The student should be able to: (a) Ascertain gross profit/loss using trading account.	i) The teacher to demonstrate how to ascertain gross profit/ loss using trading account. ii) Students individually to ascertain gross profit/loss in trading accounts.	i) Ruler ii) Ledger books	Is the student able to ascertain gross profit/loss using trading account?	**6**
		(b) Ascertain net profit/ loss.	i) The teacher to demonstrate how to ascertain net profit/ loss using profit or loss accounts ii) Students individually to ascertaining net profit/loss in profit or loss account	i) Calculators ii) Balances sheets	Is the student able to ascertain net profit/loss ?	
	8.4 Balance Sheet	The student should be able to: (a) Construct a balance sheet.	i) The teacher to demonstrate the meaning of a balance sheet ii) The teacher to guide students to construct a balance sheet iii) Students to construct a balance sheet	i) Various balance sheets ii) Ruler iii) Manila sheets	Is the student able to construct a balance sheet?	**6**

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Post entries in a balance sheet.	i) The teacher to demonstrate how to post entries in the balance sheet. ii) Students in groups to post entries in the balance sheet iii) Students to present their group work in class for evaluation. iv) Students individually to post entries in the balance sheet.	i) Various balance sheets ii) Manila sheets iii) Marker pens	Is the student able to post entries in a balance sheet?	
		(c) Interpret information from the balance sheet.	i) The teacher to guide students to interpret information from the balance sheet. ii) The teacher to guide students on preparing balance sheets. iii) Students to do exercise on interpreting balance sheets.	i) Balance sheets sample ii) Published Balance sheets iii) Principles of accounts manual	Is the student able to interpret information from the balance sheet ?	

FORM FOUR

CLASS LEVEL COMPENTENCES

Student should have the ability to:

1. Solve general mathematical problems on coordinate geometry.
2. Perform mathematical experiments and predict outcome .
3. Compute surfarce area and volume of objects .
4. Draw graphs and three dimensional figures.
5. Do computations on matrices and vectors.

CLASS LEVEL OBJECTIVES

By the end of Form Four course the student should be able to:

1. Apply mathematical knowledge and skills to form lines , calculate distance between two points and problems on parallel and perpendicular lines in two dimensional geometry
2. Drive and apply the formulae for surfarce area and volume of geometrical figures
3. Find the sum , difference and scalar multiplication of vectors and hence use the knowledge to solve practical problems.
4. Use 2 x 2 matrices to solve simultaneous equations and solve problems on transformations.
5. Calculate the probability of an even and perform simple combination of probabilities
6. Draw graph of sine and cosine functions and apply sine and cosine rules to solve problems.
7. Use oblique projections to draw three dimensional figures and find the angle between a line and a plane and the angle between two planes.

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
1.0 COORDINATE GEOMETRY	1.1 Equation of a Line	The student should be able to derive the general equation of a straight line.	i) The teacher to guide students to derive a linear equation in the general form $ax + by + c = 0$. ii) Students to rewrite linear equations in the general form	i) Graph papers ii) Squared papers iii) Geoboard iv) Rubber bands v) Graph board	Is the student able to derive the equation of a straight line in the general form?	**3**
	1.2 Midpoint of a Line Segment	The student should be able to determine the coordinates of the midpoint of a line segment.	i) The teacher to guide the students through questions and answers to form a formula for midpoint of a line segment. ii) Students to find the midpoints of a given line segment	i) Graph paper ii) Mathematical instruments	Is the student able to find the midpoint of a line segment?	**3**
	1.3 Distance Between two points on a plane	The student should be able to calculate the distance between two points on a plane.	i) The teacher to guide students in using Pythagoras theorem to form a distance formula. ii) Students to apply the formula to calculate distances on the x-y plane.	i) Graph papers/ board ii) Squared papers iii) Geoboard iv) Rubber bands v) Mathematical tables	Is the student able to calculate the distance between two points in a plane?	**3**

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	1.4 Parallel and Perpendicular Lines	The student should be able to: (a) Compute gradients in order to determine the conditions for any two lines to be parallel.	i) Students in groups to calculate the gradients of different lines. ii) The teacher to guide students to discuss the results of the gradients for the parallel lines iii) The teacher to guide students to generalize the conditions for lines to be parallel. iv) Students to do problems on parallel lines	i) Graph paper ii) Mathematical instruments iii) Geoboard iv) Rubber bands v) Squared paper vi) Graph board	Is the student able to apply conditions for parallel lines to solve problems?	10
		(b) Compute gradients in order to determine the conditions for any two lines to be perpendicular.	i) Students in groups to calculate the gradient of different lines. ii) The teacher to guide students to discuss the results of the gradients for the perpendicular lines iii) The teacher to guide students to generalize the conditions for lines to be perpendicular	i) Thin wire ii) Graph board iii) Graph paper iv) Mathematical instrument	Is the student able to apply the conditions for perpendicular lines in solving problems?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iv) Students to do problems on perpendicular lines			
		(c) Solve problems on parallel and perpendicular lines.	i) The teacher to guide students to solve problems on parallel and perpendicular lines. ii) Students to solve problems on parallel and perpendicular lines in real life.	i) Graph paper ii) Mathematical instruments	Is the student able to solve problems on parallel and perpendicular line in real life?	
2.0 AREA AND PERIMETER	2.1 Area of any Triangle	The student should be able to: (a) Derive the formula for the area of any triangle.	i) The teacher to guide students to derive the area of triangle using base and height. ii) Students to solve problems using the area formula of a triangle iii) The teacher to guide students to derive the area of any triangle when two sides and an included angle are given.	i) Geoboard ii) Squared paper iii) Graph-board iv) Mathematical instruments v) Manila paper vi) Marker pens vii) Rubber bands	Is the student able to derive the formula for the area of any triangle?	6

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iv) Students to solve problems using $A = \frac{1}{2}absinC$			
		(b) Apply the formula to find the area of any triangle.	i) The teacher to demonstrate the application of a formula $A = \frac{1}{2}absinC$ to find the area of any triangle. ii) Students to apply the formula to calculate the area of any triangle in solving problems.	i) Charts ii) Graph paper iii) Ruler	Is the student able to apply the formula to calculate areas of triangles?	
	2.2 Area of a Rhombus	The student should be able to: (a) Derive the formula for finding the area of rhombi in terms of the diagonals.	i) The teacher to guide students to brainstorm the types of triangles make by the diagonals of a rhombus. ii) The teacher to guide students to derive the formula for area of a rhombus using its diagonals.	i) Geoboard ii) Graph board iii) Mathematical instruments	Is the student able to derive the area formula for a rhombus and square?	6

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iii) Student to deduce the formula for finding the area of a square from the area of a rhombus.			
		(b) Apply the formula to find the areas of quadrilaterals.	Students to apply formulae in finding areas of quadrilaterals.	i) Playground ii) Decorations iii) Tiles iv) Mats v) Pilots vi) Buildings models	Is the student able to apply the formula to find the areas of quadrilaterals?	
	2.3 Perimeter of a Regular Polygon	The student should be able to: (a) Derive the formula for finding the length of a side of a regular polygon.	i) The teacher to guide students to discuss the relationship between a central angle and the chord subtending it. ii) The teacher to guide students to derive the formula for the length of a side of a regular polygon. iii) Students to solve problems on the length of a side of a regular polygon.	i) Geoboard ii) Mathematical instruments iii) Manila paper iv) Marker pens	Is the student able to derive the formula for the length of a side of a regular polygon?	6

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Apply the formula to determine the perimeter of a regular polygon.	i) Students to deduce the formula for perimeter of a regular polygon. ii) Students to apply the formula to calculate the perimeter of regular polygons	i) Mathematical instruments ii) Manila paper iii) Marker pens	Is the student able to apply the formula for the perimeter of regular polygons?	
	2.4 Area of a Regular Polygon	The student should be able to (a) Derive the formula for finding the area of a regular polygon.	i) Students to derive the formula for the area of regular polygon given different sides. ii) The teacher to guide the students to derive the formula of the area of a regular polygon	i) Manila paper ii) Marker pens iii) Mathematical tables iv) Mathematical instruments	Is the student able to derive the formula for finding the area of regular polygons?	6
		(b) Apply the formula to calculate the area of a regular polygon.	i) Students in groups to apply the formula in finding the area of regular polygons found in daily life. ii) Students to present their group work in class. iii) The teacher to guide discussion on the presented work.	i) Mathematical instruments ii) Mathematical table	Is the student able to apply formula to calculate area of regular polygons?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	2.5 Area of Similar Polygons	The student should be able to: (a) Find the ratio of areas of similar polygons.	i) The teacher to guide students to find the ratio of the areas of two similar triangles where k is the ratio of their corresponding sides. ii) Students in groups to compare ratio for area of similar rectangles and squares. iii) The teacher to guide students to generalize their results to ratio of areas of any similar polygons.	i) Mathematical instruments. ii) Mathematical tables. iii) Manila paper iv) Marker pens v) Geo board vi) Rubber bands	Is the student able to derive the ratio for area of similar polygons?	6
		(b) Solve problems related to ratio for areas of similar polygons.	i) The teacher to guide students in solving problems related to ratio of areas of similar polygons. ii) Students to solve problems related to ratio of area of similar polygons.	i) Mathematical instruments. ii) Mathematical tables	Is the student able to solve problems related to ratio of areas of similar polygons?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
3.0 THREE DIMEN SIONAL FIGURES	3.1 Three Dimensional Figure	The student should be able to: (a) Classify three dimensional figures.	i) Students to collect various three dimensional objects. ii) The teacher to guide students to classify the objects into cones, pyramids, prisms and cylinders	i) Manila card ii) Cones iii) Pyramids iv) Prisms v) Cylinders	Is the student able to classify three dimensional figures?	6
		(b) List the characteristics of each class.	i) The teacher to guide students to discuss the characteristics of each class of three dimensional objects. ii) Students to list the characteristics of classes of three dimensional figures.	Three dimensional objects/models	Is the student able to list the characteristics of three dimensional objects?	
	3.2 Construction of Three Dimensional Figures	The student should be able to construct three dimensional figures.	i) The teacher to guide students to sketch nets of three dimensional figures. ii) Students to construct three dimensional figures in groups by using simple material such as papers, manila cards, straws and sticks.	i) Papers ii) Manila cards iii) Straws iv) Sticks v) Glue vi) Scissors vii) Thread viii) Mathematical instruments	Is the student able to construct three dimensional objects?	4

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			iii) Students to display their three dimensional figures for evaluation			
	3.3 Sketching Three Dimensional Figures	The student should be able to: (a) Sketch three dimensional figures.	i) The teacher to demonstrate how to draw sketches of three dimensional figures using oblique projections. ii) Students to sketch three dimensional figures using oblique projections.	i) Mathematical instrument ii) Manila papers iii) Marker pens	Is the student able to sketch three dimensional figures?	12
		(b) Identify properties of three dimensional figures.	i) The teacher to guide students to discuss planes, edges and diagonals in three dimensional objects/ figures ii) Students to identify and state the planes, edges, vertices and diagonals in three dimensional figures.	i) Boxes ii) Tins iii) Buildings models iv) Car models v) Three dimensional models	Is the student able to identify the properties of three dimensional figures?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(c) Find the angle between a line and a plane.	i) The teacher to guide students to locate and find the angle between a line and a plane. ii) Students to find the angle between lines and planes of different three dimensional figures.	i) Three dimensional objects/models. ii) Mathematical instruments	Is the student able to find the angle between a line and a plane?	
		(d) Calculate the angle between two planes.	i) The teacher to guide students to visualize and discuss intersecting planes of three dimensional figures. ii) The teacher to guide students to calculate the angle between two intersecting planes. iii) Students to calculate the angle between two intersecting planes	i) Three dimensional objects/models ii) Mathematical instruments	Is the student able to calculate the angle between two planes?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	3.4 Surface Area of Three Dimensional Objects	The student should be able to: (a) Derive the formulae for calculating the surface area of prisms, cylinders, and pyramids and cone.	i) The teacher to guide students to derive the formulae of surface area of prisms, cylinders, pyramids and cones. ii) The teacher to guide students to calculate the surface areas of prisms, cylinders and pyramids . iii) Students in groups, to calculate the surface areas of prisms, cylinders and pyramids.	i) Three dimensional objects ii) Mathematical tables iii) Mathematical instruments iv) Scientific pocket calculators	Is the student able to derive formula for calculating surface areas of prisms, cylinders pyramids and cones?	6
		(b) Apply the formulae to calculate the surface area of spheres.	i) The teacher to guide students to use the formula in calculating surface area of a sphere. ii) Students to calculate the surface area of spheres	i) The globe ii) Oranges iii) Water-melon iv) Models	Is the student able to calculate the surface area of spheres?	

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	3.5 Volume of three Dimensional Objects	The student should be able to: (a) Derive the formulae for calculating volume of prisms, cylinders, pyramids and cones.	i) The teacher to guide students to derive the formulae for finding the volume of prisms, cylinders, pyramids and cones. ii) The teacher to guide a discussion on how to find the volume of prisms and cylinders by using the base area and the height. iii) Students to calculate the volume of prisms and cylinders.	i) Three dimensional figures/models ii) Mathematical tables. iii) Mathematical instruments. iv) Scientific pocket calculators.	Is the student able to derive the formulae for volume of prisms, cylinders, pyramids and cones?	6
		(b) Apply the formulae to calculate the volume of cylinders pyramids and cones.	i) The teacher to guide students to apply the formula of a cone and pyramid, prisms and cylinder ii) Students to apply the formula $V = \frac{1}{3} \times base\ area$ to calculate the volume of cones and pyramids	i) Mathematical table ii) Scientific pocket calculators	Is the student able to calculate the volume of prisms, cylinders pyramids and cones?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
4.0 PROBABILITY	4.1 Probability of an Event	The student should be able to (a) Determine the probability of an event through experiments.	i) The teacher to guide students to perform the experiments such as rolling a die or tossing a coin in order to develop the concept of probability of an event. ii) Students to perform experiments on probability and record their results. iii) The teacher to guide student to use the results obtained to define probability	i) Coin ii) Die iii) Coloured objects iv) Cloth v) Cards vi) Games	Is the student able to determine the probability of an event through experiment?	12
		(b) Interpret experimental results in relation to real life occurrences.	i) The teacher to guide students through questions and answers to interpret experimental results in real life situation. ii) Students in groups to do experiment using large number of trials	i) Coin ii) Die iii) Coloured objects iv) Cloth v) Playing cards vi) Games	Is the student able to interpret experimental results in relation to real life occurrences?	

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		(c) Write the formula for finding the probability of an event.	i) The teacher to guide students to discuss how to write the formula of the probability for an event from the experimental results. ii) Students individually to write the formula for finding probability of an event	i) Games ii) Coins iii) Die iv) Coloured objects v) Playing cards	Is the student able to write the formula for finding probability of an event?	
		(d) Apply the formula to calculate the probability of an event.	i) The teacher to guide students to apply the formula for finding the probability of an event. ii) The teacher to guide students to discuss how to find the probabilities of event to occur or not to occur. iii) Students to solve problems on probability.	Charts	Is the student able to calculate the probability of an event?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	4.2 Combined Events	The student should be able to: (a) Perform experiments of two combined events.	i) The teacher to guide students to perform the activities of doing two events at the same time in order to explain the concept of combined events. ii) Students to perform experiments and record the results	i) Coin ii) Die iii) Coloured objects iv) Cloth games	Is the student able to perform experiments of two combined events?	12
		(b) Draw a three diagram of combined events.	i) The teacher to guide students to perform the activities of doing two events at the same time in order to find the probability of combined events by the use of a tree diagram. ii) Students to solve problems on probability of combined events by the use of three diagrams.	i) Die ii) Playing cards iii) Coloured objects iv) Coins v) Cloth vi) Ruler vii) Games	Is the student able to draw a tree diagram of combine events?	

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		(c) Find the probability of two combined events using the formula.	i) The teacher to guide students to find the probability of two combined events using the formula. ii) Students to calculate the probability of two combined events by formula	i) Coins ii) Die iii) Games iv) Population records v) Weather forecast	Is the student able to find the probability of two combined events?	
		(d) Apply the knowledge of probability to determine the occurrence of events in real life situation.	i) The teacher to guide students to brainstorm on application of the knowledge of probability in real life situation. ii) Students to apply the knowledge of probability to predict outcomes of occurrences in real life.	i) Genetics ii) Population records iii) Weather forecast	Is the student able to apply the knowledge of probability to determine the occurrence of events in real life situation?	

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5.0 TRIGONOMETRY	5.1 Trigonometric Ratios	The student should be able to: (a) Determine the sine, cosine and tangent of an angle measured in the clockwise and anticlockwise directions.	i) The teacher to guide the students to discuss the sign of sines, cosines and tangent for angles in the four quadrants ii) Students in groups to find sine, cosine and tangent of angles measured in any direction.	i) Mathematical tables ii) Trigonometric tables iii) Calculators	Is the student able to determine the trigonometric ratios of a given angle?	7
		(b) Apply trigonometric ratios to solve problems in daily life.	i) The teacher toguide students to do activities which involve applications of trigonometric ratios in daily life such as finding heights of towers, buildings, mountains and width of rivers. ii) Students to work individually to use trigonometric ratios in solving problems.	i) Treadle wheel ii) Clinometer iii) Rope iv) Rule v) Tape measure vi) Trigonometric tables vii) Protractor	Is the student able to find distances indirectly by applying trigonometric ratios?	

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			iii) The teacher to guide students to solve problems using trigonometric tables or scale drawing			
	5.2 Sine and Cosine Functions	The student should be able to (a) Find sines and cosines of angles θ such that $-720^o \leq \theta \leq 720^o$	i) The teacher to guide students to prepare table of values of sine and cosine of angle q such that $-720^o \leq \theta \leq 720^o$ ii) The teacher to guide students to draw the graph of sine and cosine functions using table of values. iii) The teacher to use questions and answers to discuss features of the graphs of sine and cosine functions	i) Ruler ii) Graph paper iii) Squared papers iv) Graph board	Is the student able to find sine and cosine of a given angle?	6
		(b) Interpret the graphs of sine and cosine functions.	i) The teacher to guide students to interpret the graphs of sine and cosine functions by using words such as even or odd functions, and periodic or non periodic function.	Graphs of sines and cosines	Is the student able to interpret correctly graphs of sine and cosine functions?	

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			ii) Students to identify even or odd functions and periodic or non periodic function			
	5.3 Sine and Cosine Rules	The student should be able to: (a) Derive the sine and cosine rules.	i) The teacher to guide students to derive the sine rule. ii) Students in groups to solve problems using the sine rules. iii) The teacher to guide students to derive the cosine rule. iv) Students in groups to solve problems using the cosine rule. v) The teacher to demonstrate how to solve problems related to the sine or cosine rule by drawing construction. vi) Students to solve problems related to sine or cosine rule by drawing or construction	i) Ruler ii) Coloured chalk	Is the student able to derive the sine and cosine rules?	7

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		(b) Apply the sine and cosine rules in solving problems on triangles.	i) The teacher to guide students to use the sine and cosine rules in solving real life problems individually ii) Students individually to apply sine and cosine rules to solve related problems	i) Rules ii) Coloured chalks	Is the student able to apply the sine and cosine rules in solving triangles?	
	5.4 Compound Angles	The student should be able to apply the compound angle formulae for sine, cosine and tangent in solving trigonometric problems.	i) The teacher to explain the compound angles for sine and cosine. ii) The teacher to demonstrate to students the use of compound angle formulae in solving and simplifying trigonometric problems. iii) Students in groups to solve and simplify trigonometric problems using compound angle formulae.	i) Charts of trigonometric formulae for compound angles. ii) Trigonometric tables	Is the student able to apply the compound angle formulae to solve trigonometric problems?	4

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
6.0 VECTORS	6.1 Displacement and Position Vectors	The student should be able to: (a) Explain the concept of a vector quantity.	i) The teacher to guide students through questions and answers to explain the concept of a vector quantity. ii) Students in groups to discuss the difference between the vector and scalar quantities.	i) Graph board ii) Ruler iii) Graph papers iv) Set square v) Coloured chalks vi) Geo board vii) Rubber bands viii) Squared paper	Is the student able to explain the concept of a vector quantity?	8
		(b) Distinguish between displacement and position vectors.	i) The teacher to guide students in discussing the meaning of displacement equivalent and position vectors. ii) Students in groups to distinguish between displacement position and equivalent vectors in two dimensions	i) Geo board ii) Graphs papers iii) Mathematical instruments	Is the student able to distinguish between displacement and position vectors?	
		(c) Resolve any vector into *i* and *j* components.	i) The teacher to guide students to discuss how to resolve a given vector into *i* and *j* components ii) Students individually to resolve given *i* and *j* vectors into components.	i) Graph paper ii) Coloured chalks iii) Mathematical instruments	Is the student able to resolve any vector into *i* and *j* components?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
	6.2 Magnitude and Direction of a Vector	The student should be able to calculate the magnitude and direction of a vector.	i) The teacher to guide students to discuss how to find the magnitude and direction of a vector ii) Students individually to calculate the magnitude and direction of a vector.	i) Mathematical table ii) Mathematical instruments	Is the student able to calculate the magnitude and direction of a vector?	4
	6.3 Sum and Difference of Vectors	The student should be able to: (a) Find the sum of two or more vectors.	i) The teacher to demonstrate how to find the sum of two or more vectors diagrammatically. ii) Students to find the sum of given vectors by drawing. iii) The teacher to guide students to discuss how to find the sum of vectors without using diagrams iv) Students in groups to find the sum of vectors without using diagrams	Graph paper Mathematical instruments	Is the student able to find the sum of two or more vectors?	6

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		(b) Find the difference of vectors.	i) The teacher to explain the meaning of opposite vector. ii) The teacher to demonstrate how to find diagrammatically the difference of vectors by using opposite vectors. iii) Students to find the difference of given vectors by drawing. iv) The teacher to guide students to discuss how to find the difference of vectors without using diagrams. v) Students in groups to find the difference between vectors without using diagrams.	i) Geoboard ii) Rubber bands iii) Ruler iv) Coloured chalks v) Graph papers vi) Squared papers vii) Graph board	Is the student able to find the difference of vectors?	
	6.4 Multiplication of a Vector by a Scalar	The student should be able to multiply a vector by a scalar.	i) The teacher to use examples to discuss with students how to multiply a vector by a scalar.	i) Coloured chalks ii) Ruler	Is the student able to multiply a vector by a scalar?	4

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			ii) The teacher through questions and answers to demonstrate how to multiply a vector by a scalar.			
	6.5 Application of Vectors	The student should be able to apply vectors in solving simple problems on velocities, displacements and forces.	i) The teacher to guide students to discuss the use of vectors in solving simple problems on velocities. ii) The teacher to demonstrate how to find bearings by drawing and measuring. iii) Students to do exercises on application of vectors in solving real life problems.	i) Ruler ii) Protractor iii) Coloured chalks iv) Magnetic compass v) Set square vi) Squared paper vii) Graph board viii) Graph papers	Is the student able to apply vectors in solving problems on velocities, displacements and forces?	5
7.0 MATRICES AND TRANSFORMA-TIONS	7.1 Operations on Matrices	The student should be able to: (a) Explain the concept of a matrix.	i) Students to collect price lists of items. ii) The teacher to guide the students on how to organize the items and prices in columns and rows (rectangular array).	i) Coloured chalks ii) Prices of items	Is the student able to explain the concept of matrix?	16

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			iii) The teacher to guide students to explain the meaning of matrix.			
		(b) Add matrices of order up to 2 × 2.	i) The teacher to demonstrate how to add matrices of order up to 2 × 2. ii) Students in pairs to solve problems on addition of 2 × 2 matrices	Charts of matrices	Is the student able to add 2 × 2 matrices?	
		(c) Subtract matrices of order up to 2 × 2.	i) The teacher to demonstrate how to subtract matrices of order up to 2 × 2. ii) Students in groups to Solve problems on subtraction of matrices of order up to 2 × 2	Charts of matrices	Is the student able to subtract matrices of order up to 2 × 2?	
		(d) Multiply a matrix of order 2 × 2 by a scalar.	i) The teacher to demonstrate the multiplication of a 2 × 2 matrix by a scalar. ii) Students in pairs to solve problems on multiplication of 2 × 2 matrices by scalars.	i) Coloured chalk ii) Charts of matrices	Is the student able to multiply a 2 × 2 matrix by a scalar?	

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		(e) Multiply two matrices of order up to 2 × 2	i) The teacher to demonstrate the multiplication of two matrices of order up to 2 × 2 ii) Students in pairs to do exercises on multiplying two matrices of order up to 2 × 2	i) Charts of matrices ii) Coloured chalk	Is the student able to multiply two matrices of order up to 2 × 2?	
	7.2 Inverse of a Matrix	The student should be able to: (a) Calculate the determinant of a 2 × 2 matrix.	i) The teacher to demonstrate how to calculate the determinant of a 2 × 2 matrix. ii) Students in groups to calculate the determinants of given 2 × 2 matrices.	Charts of determinants of matrices	Is the student able to calculate the determinant of a 2 × 2 matrix?	9
		(b) Find the inverse of a 2 × 2 matrix.	i) The teacher to guide students in finding the inverse of a matrix. ii) Students in small groups to find the inverse of given matrix	Charts of inverses of matrices	Is the student able to find the inverse of a 2 × 2 matrix?	

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		(c) Apply 2 × 2 matrices to solve simultaneous equations.	i) The teacher to guide students to discuss the application of 2 × 2 matrices in solving simultaneous equations. ii) Students in small groups to apply 2 × 2 matrices in solving simultaneous equations		Is the student able to apply 2 × 2 matrices to solve simultaneous equations?	
	7.3. Matrices and Transformations	The student should be able to: (a) Transform any point *P (x, y)* into $p_1(x_1, y_1)$ by pre- multiplying $\begin{pmatrix} x \\ y \end{pmatrix}$ with a transformation matrix $T = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$	i) The teacher to guide students to discuss how to multiply a 2 × 2 matrix and a column matrix. ii) The teacher to use examples to demonstrate a transformation of a point by a transformation matrix. iii) Students in pairs to transform the given points by using different transformation matrices	i) Colourded chalks ii) Graph board iii) Mathematical tables iv) Ruler v) Geoboard vi) Rubber bands vii) Graph papers viii) Squared paper	Is the student able to transform a point by pre-multiplying its column transformation matrix by a matrix?	16

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Apply the matrix  to reflect a point *P(x,y)* in the *x* – axis	i) The teacher to guide students to reflect a point *p(x, y)* in the x-axis using the matrix  ii) Students to work individually in reflecting given points in x-axis using the appropriate matrix	i) Ruler ii) Geoboard iii) Rubber bands iv) Graph papers v) Squared papers vi) Graph board vii) Mathematical table	Is the student able to apply the matrix  to reflect a point *P(x,y)* in the *x* – axis?	
		(c) Apply the matrix  to reflect a point *p (x, y)* in the y – axis	i) The teacher to guide students to reflect a point *p (x, y)* in the *y*-axis using the matrix  ii) Students to work individually in reflecting given points in the *y*-axis using the appropriate matrix.	i) Geo board ii) Rule iii) Colourd chalk iv) Rubber bands v) Mathematical tables	Is the student able to apply the matrix  to reflect the point *P(x, y)* in the *y* axis?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(d) Use a matrix operator to rotate any point P(x,y) through 90^o, 180^o,270^o and 360^o about the origin	i) The teacher to use examples to demonstrate the rotation of a point p(x , y) through 90^o, 180^o, 270^o and 360^o about the origin using the rotation matri $T=\begin{pmatrix} \sin\theta & \cos\theta \\ \cos\theta & \sin\theta \end{pmatrix}$ ii) Students in groups to rotate various points through 90^o, 280^o, 270^o and 360^o about the origin using the appropriate transformation matrix	i) Geo board ii) Rule iii) Graph paper iv) Rubber bands v) Mathematical tables	Is the student able to rotate a point P(x, y) through 90^o, 180^o 270^o, 360^o about the origin by using a matrix?	
		(e) Use the enlargement matrix $E=\begin{pmatrix} K & O \\ O & K \end{pmatrix}$ in enlarging figures	i) The teacher to use examples to demonstrate the enlargement of figures using a matrix . $E=\begin{pmatrix} K & O \\ O & K \end{pmatrix}$	i) Geoboard ii) Coloured chalk iii) Rule iv) Rubber bands matrix . $E=\begin{pmatrix} K & O \\ O & K \end{pmatrix}$	Is the student able to enlarge a figure given an enlargement factor of the form?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
			ii) Students in pairs to enlarge given figures using the enlargement matrix			
8.0 LINEAR PROGRAM-MING	8.1 Simultaneous Equations	The student should be able to: (a) Form simultaneous equation from word problems.	i) The teacher to use examples in guideing a discussion on how to formulate linear simultaneous equations from word problems. ii) Students to formulate linear simultaneous equation from work problems individually.	i) Graph paper ii) Ruler iii) Square papers iv) Geoboard v) Rubber bands vi) Graph board	Is the student able to form simultaneous equations from word problems?	6
		(b) Solve simultaneous equations graphically	i) The teacher to guide students to solve linear simultaneous equations graphically. ii) Students in groups to solve various linear simultaneous equations formulated from word problems graphically.	i) Graph board ii) Graph paper iii) Ruler iv) Geoboard v) Rubber bands vi) Coloured chalk	Is the student able to solve simultaneous equations graphically?	

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	8.2 Inequalities	The student should be able to: (a) Form linear inequalities in two unknowns from word problems.	i) The teacher to guide students to form linear inequalities in two unknowns from a word problem. ii) Students in groups to formulate linear inequalities in two unknowns from word problems	i) Manila paper ii) Charts	Is the student able to form linear inequalities in two unknowns?	6
		(b) Find the solution set of simultaneous linear inequalities graphically.	i) The teacher to demonstrate to students the determination of feasible region of a set of linear inequalities graphically. ii) Students in groups to solve problems on determining the solution of a set of linear inequalities graphically	i) Graph board ii) Graph papers iii) Geoboard iv) Rubber bands v) Ruler vi) Coloured chalks vii) Pencil viii) Squared paper	Is the student able to find the solution set of simultaneous inequalities graphically?	

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	8.3 The objective Function	The student should be able to form an objective function from word problems.	i) The teacher to guide students to discuss how to formulate an objective function from a word problem. ii) Students in groups to form an objective function from given word problems	Manila paper	Is the student able to form the objective function from a given word problem?	4
	8.4 Maximum and Minimum Values	The student should be able to: (a) Locate corner points on the feasible region.	i) The teacher to guide students to determine the coordinates of corner points of the feasible region. ii) Students to draw the graphs of linear inequalities formulated from a word problem and determine the coordinates of points of the visible region.	i) Graph board ii) Graph paper iii) Geoboard iv) Rubber bands v) Ruler vi) Coloured Chalk vii) Squared paper	Is the student able to locate corner points of the feasible region of a linear programming problem?	8

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(b) Find the minimum and maximum values using the objective function.	i) The teacher to illustrate the maximum and minimum values using the objective function graphically. ii) Students in groups to practice on determining the maximum and minimum values using the objective function graphically. iii) The teacher to guide students to discuss how to find the maximum and minimum values by substituting the corner points of a feasible region in the objective function. iv) Students individually to find the maximum and minimum values of the given problems by substituting the corner points in the objective functions.	i) Ruler ii) Geoboard iii) Coloured Chalks iv) Rubber bands v) Graph paper vi) Squared paper vii) Graph board	Is the student able to find the maximum or minimum values of a given objective function?	

TOPIC	SUB-TOPICS	**SPECIFIC OBJECTIVES**	**TEACHING AND LEARNING STRATEGIES**	**TEACHING AND LEARNING RESOURCES**	**ASSESSMENT**	**NUMBER OF PERIODS**
		(c) Apply linear programming in solving simple real life problems.	i) The teacher to guide students to brainstorm on daily life situation in which linear programming is applicable. ii) The teacher to guide students to apply the linear programming knowledge to solve daily life problems. iii) Students to solve problems from their daily life on linear programming.	i) Graph board ii) Graph paper iii) Coloured chalk iv) Pencil v) Ruler vi) Geoboard vii) Rubber bands viii) Squared paper	Is the student able to apply linear programming in solving simple real life problems?	