

Appendix (4)

Translation of the mathematics curriculum in Jordan during the third period (1987 – 1999).

This appendix includes a description of the documents of mathematics curriculum in Jordan during the third period (1987 - 1999). Also, this appendix includes on translating of The learning objectives and mathematical content translating from Arabic language to English. During this period there are two documents for teaching mathematics credited by Ministry of Education (M.O.E.) the first document for Basic Stage which includes (1 – 10 grades) ; and the second document for secondary stages which includes (11 – 12 grades).

Firstly: Mathematics Curriculum for Basic stage(1 - 10 grades)

The curriculum document for Basic Stage (M.O.E, 1991) includes the following aspects:

- The first part: Mathematics Curricula for Basic Stage.
- The Aims and Evaluation,
- The mathematical content across the grades (1 – 10),
- The mathematical topics (instructional units) for grades of stage.
- The instructional units for first grade.
- The instructional units for second grade.
- The instructional units for third grade.
- The instructional units for fourth grade.
- The instructional units for fifth grade.
- The instructional units for sixth grade.
- The instructional units for seventh grade.
- The instructional units for eighth grade.
- The instructional units for ninth grade.
- The instructional units for tenth grade.
- The Methods of Evaluation.
- Table of distributing periods for basic grades
- The second part: the guide line of mathematics curriculum in the Basic Stage, which includes on seven guidelines represented with: general principles for curriculum of Basic education, curriculum design and elements, general learning objectives, instructional plan through the grades and fundamental concepts, General Suggestions for methods of teaching mathematics and evaluation, Methods of curriculum executive , and the curriculum evaluation and development.
- Appendix classified the scope and sequences of mathematical content among the grades.

1.1 The learning objectives of teaching mathematics for the Basic Stage (1 - 10 grades).

Document of mathematics curriculum which approved by the Ministry of Education in Jordan for this period specify learning objectives for the Basic stage, according to two aspects , The General learning objectives, and The special learning objectives for teaching mathematics.

1.1.1 The General learning objectives of teaching mathematics.

The general learning objectives of teaching mathematics described according to three aspects, as follow:

a) **Mathematical Information and Concepts**

- To provide students with the mathematical information and skills necessary in other fields of knowledge
- To develop their understanding of the nature of mathematics as an organized structure of knowledge.
- To expand their perception of their physical surroundings
- To recognize on mathematical language, and their proprieties and uses .
- To recognize on measurement systems, especially metric measurement.

b) **Mathematical Skills**

- To provide student with the necessary skills in real life
- To use the necessary skills to plan for their personal lives.
- To develop the skills of student in mental calculation.
- To develop their calculation skill using a variety of tools
- To use mathematical language to express daily situations
- To develop their skill in classification, tabulation, graphical representation and reading and interpretation of data
- To be able to represent mathematical relations graphically
- To be able to conclude results from information presented graphically
- To be able to use a different tools of measurement.

c) **Improving Thinking and Problem Solving Approaches**

1. To be able to think scientifically using :

- To use Logical proof methods to conclude mathematical relations from given hypotheses
 - To learn and use the steps of problem-solving
 - The use of problem solving steps to solve real life situations
 - To test the validity and reasonability of results found
 - To support conclusions and views with necessary data
 - To use reason and rationality to judge results
2. To identify similarities and differences in mathematical models and relations
3. To use relations between two-dimensional and multi-dimensional geometric to solve real life problems.

d) **The developing of Positive Attitudes Towards Mathematics.**

1. To enable students to understand the social and informative contribution of development of mathematical knowledge
2. To enable students to explore the aspects of beauty and harmony through learning the geometrical shapes and algebraic structures.
3. To enhance their self-confidence using mathematical approaches as the mathematical proof, and problem solving.
4. To develop positive attitudes towards mathematics and appreciate the role of the pioneers in the mathematics field.
5. To appreciate the contribution of Islamic and international scientists in the mathematics field.

1.1.2 The Special learning objectives of teaching mathematics.

The special learning objectives of teaching mathematics described according to two aspects, learning objectives of cognition approaches, and learning objectives of affective approaches, as follow:

a) Learning objectives of cognition approaches

According to this approach the learning objectives divided into three aspects as follow:

1. Mathematical Communication Objectives

- To use numbers to express quantities and measures
- To use symbols to express ideas accurately
- To be able to read tables and figures which faced in real life.
- To organize information and data in tables and graphs
- To estimate and approximate quantities and measurements
- To use mathematical operations in solving problems in daily life
- To pose definite questions while using mathematical concepts and skills
- To be able to identify features and relations connecting mathematical concepts and generalizations

2. Mathematical Thinking Objectives

1. To think scientifically, in accordance with the growth stages, using: Comprehension, hypothesis, tests, implementation, explanation, measurement of quantities, comparison, conclusion, analysis, reason, identification, induction, deduction, categorization, estimation, approximation, planning, proof
2. To use and employ problem-solving steps in daily life problems through :
 - To analyze the situation
 - To plan for the solution
 - To implement the solution
 - To revise in order to validate
3. To develop the ability of thinking in multi-dimensions
4. To think neutrally and objectively
5. To suggest alternatives solutions to solve problems
6. To develop mathematical knowledge by their selves through using multiple references and resources.

3. The Basic Mathematical Skills Objectives

- To perform mathematical operations on numbers
- To solve daily situations that involve using numbers
- To use the concepts of ratio and percentages to solve application problems
- To categorize and present data using tables and figures and draw conclusions
- To express and transfer real life situations in mathematical language
- to solve real life problems by using variant operations on algebraic terms.
- To solve trigonometric and algebraic equations
- To solve linear inequalities with two variables at most.
- To solve system of equations with three variables at most.
- To represent relations and functions graphically.

- To use the concepts of analytical geometry to proof the validity of plain geometry and find geometrical solutions.
- To find the straight-line equations and circle in the plane.
- To calculate the probabilities of events and predict their probabilities.
- To calculate statistical measures like mean, median and standard deviation from tables of frequency.
- To calculate lengths, areas and volumes using the metric system.
- To calculate mass, angles, temperatures and time.
- To use estimation and approximation in mathematical operations.
- To categorize geometrical figures, both plane and solid, in light of their properties.
- To use geometrical tools to draw geometrical figures.
- To proof on the validity of generalizations in the subjects of algebra, plain geometry, spatial geometry and trigonometry.
- To use trigonometric ratios to solve applied problems.
- To apply a variety of rules and principals in solving mathematical problems.

B) Learning objectives of affective approach

1. To appreciate the contribution of international scientists in the field with special regard to Islamic and Arab scientists
2. To develop the sense of beauty and harmony found in mathematical figures and structures
3. To develop a positive attitude in students towards mathematics and follow learning
4. To appreciate the role of the pioneers of the field
5. To enhance self-confidence by successfully solving problems and developing the ability to reason and justify
6. To use mathematics for entertainment activities like solving puzzles and drawing
7. To develop characteristics of accuracy and order while performing daily activities
8. To identify the role of mathematics in other fields of knowledge
9. To appreciate the role of mathematics in the situations of real life

1.2 The mathematical content of teaching mathematics for the Basic stage (1 - 10 grades).

The mathematical content of mathematic curriculum for all educational stages, presented in the documents as a table, which contained on a description of the units (topics) and mathematical content, behavior objectives, and description for instructional activities of instructional units for all grades. for example on presentation of mathematical content on the two documents.

The document of mathematics curriculum for Basic grades, presented the **Numbers within (0 up to 999)** for second grade as follow :

Class: 2		First unit: the Numbers (0 up to 999)	No. of periods(16 –18)
Learning objectives	The content	Methods and activities	
<ul style="list-style-type: none"> - To recognize on the number 100 - To recognize on dinar(100) - Counting using hundred up to 900. - Reading and Writing numbers within three place values. - Finding the place value of digit of a given number. - Ordering set of numbers up and down. - Understanding the even and odd numbers. 	<p>Concepts and vocabulary</p> <ul style="list-style-type: none"> - Numbers (0 up to 999) - The hundred place value - even and odd numbers. <p>Skills:</p> <ul style="list-style-type: none"> - reading numbers within 999. -writing numbers within 999. - analyzing numbers using the place value. digits. - Ordering numbers up and down. 	<ul style="list-style-type: none"> - presented this unit as extent to what learned about numbers within two place values, and using in presenting the objects and money. - Presenting activities for student to write numbers given orally . - Presenting activities to translate numbers wrote in words to numbers and to read numbers wrote by figures - Comparing between two numbers within 999, through presenting numerical examples to reach the style follow: to compare between two numbers we start comparing the hundreds values if they are equal, then comparing the tenth values, and if they are equals then we comparing the first values. - Presenting activities to build greatest and smallest number through three numbers given. - Presenting even and odd numbers through counting. - Review the numbers from 0 to 99. 	

The mathematical content for all the grades of Basic stage translated to English language, according to the units (topics) of the content, which it included in the document, and organizing in tables for all grades (1 to 10) as follow:

Content	The mathematical content of 1st grade
Numbers	<ul style="list-style-type: none"> - Concept of number. - Numbers 1, 2, 3, 4 reading and writing. - Numbers 5, 6, 7, 8, 9 reading and writing. - Concept and symbol of zero.
Ordering Numbers	<ul style="list-style-type: none"> - Ordering numbers (0 to 9). - Ordering Counting (first, second ...ninth). - Comparing numbers by using greater and smaller relations.
Addition within 9	<ul style="list-style-type: none"> - Concept of addition operation - Symbols of addition and equal - facts of addition and commutative property
Subtraction within 9	<ul style="list-style-type: none"> - Concept of subtraction - Subtraction sign - Facts of subtraction - The relation between addition and subtraction operations
Numbers up to 99	<ul style="list-style-type: none"> - Concept of the number ten, and writing. - Counting by tenth up to 90. - Reading and writing numbers from 11 to 99. - The place values of numbers 11 to 99. - Ordering numbers up to 99.
Addition and subtraction	<ul style="list-style-type: none"> - Facts of addition without carrying within 18. - facts of subtraction without borrowing within 18.
Measurement	<ul style="list-style-type: none"> - Length : using non standards units to measure some lengths. - Time : day as a unit of time, and week days.
Fractions and geometrical shapes	<ul style="list-style-type: none"> - Recognizing on the shapes of the: - Sphere, rectangular solid, rectangle and circle. - Concept of Fractions: $\frac{1}{2}$, $\frac{1}{4}$ without writing them.

Unit (topics)	The mathematical content of 2nd grade
The Numbers (0 to 999)	<ul style="list-style-type: none"> - Reviewing The concepts of numbers up to 99: reading , writing and ordering. - Counting by ordering from tenth up to 20 - Reading and writing the hundred - Reading and writing numbers with three digits - Place value of numbers within 999. - Analyzing numbers of three digits to component as a combination and finding the place value for numbers (units, tens and hundreds). - Ordering numbers within 999 up and down - concepts of Even and odd numbers within 20.
The addition within 999	<ul style="list-style-type: none"> - Reviewing the concepts addition by carrying without carrying within 99 - Reviewing the concepts addition by carrying with carrying within 99 - Addition within 999 - Solving problems with one step on addition.
Subtracting within 999	<ul style="list-style-type: none"> - Reviewing the concepts of subtraction without borrow within 99 - Reviewing the concepts of subtraction with borrow within 99 - The concepts of subtraction within 999 - Solving problems with one step on subtraction.
Multiplication	<ul style="list-style-type: none"> - Counting by multiples of 2 to 10, 3 to 15, 4 to 20, and 5 to 25,

	<ul style="list-style-type: none"> - the concept and sign of multiplication as a process repeated of addition. - Concept of Multiplication as repeating of addition - Commutative property through numerical examples - fact of multiplication within 25 - Solving problems with one step on facts of multiplication
Measurement	<ul style="list-style-type: none"> - To recognize on the meter and centimeter - Money: dinar, half and quarter . - Month as unit of time, and relations with year and seasons. - O'clock: reading in half and quarter.
Geometrical shapes	<ul style="list-style-type: none"> - Concept and sign of division . - Concept of division as divided the sets to equivalent parts. - Facts of division operation within 25. - The relation between multiplication and division. - Solving problems with one step on Division.
Fraction and	<ul style="list-style-type: none"> - concepts of Fractions: $1\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{2}{4}$, $\frac{3}{4}$ reading and writing.
	<ul style="list-style-type: none"> - to recognize on the concepts and shape of the cylinder, cone and cube - to recognize on the concepts and shape of triangle and square - symmetrical the geometrical shapes experimentally .

Unit (Topic)	The mathematical content of 3rd grade
The Numbers up to 9999 addition and subtraction	<ul style="list-style-type: none"> - Reviewing numbers within 999: reading , writing and ordering. - Reading and writing thousand - Reading and writing numbers within 999. - the place values of numbers - Numbers ordering within 9999 using the symbols()and(!) .
Addition and subtraction within 9999	<ul style="list-style-type: none"> - Adding numbers within (9999). - Subtracting numbers within the number (9999) - Solving application problems on numbers addition and subtraction.
Geometry	<ul style="list-style-type: none"> - Concepts : point, line, segment - Drawing the segment - Properties of triangles, rectangle, square an drawing the shapes.
Measurement and Money	<ul style="list-style-type: none"> - Wight: kg and relation with gram - Money : relations between units of Dinar. - Time : reading the time (hours) . - Length :kilometer, cm, mm - Relation between km and the units - Using non standards measurements - Application problems.
Facts of Multiplication and Division	<ul style="list-style-type: none"> - Counting using multiple of numbers up to ten times. - Multiplication table from 1×0 to 10×5 - Commutative property on numbers multiplication - Facts of multiplication up to 10×10 - Division as opposite operation of multiplication - Facts of division - Application problems with two steps at most.
Multiplication	<ul style="list-style-type: none"> - Multiplication of two–digit number by number of one-digit. - Multiplication of two–digit number by a two-digit number - Application problems with two steps at most.
The Common Fractions	<ul style="list-style-type: none"> - Reviewing fractions: $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{3}$, $\frac{2}{3}$, - Fractions with denominators 6 - Fractions with denominators 8 - Fractions with denominators up to 10
Division	<ul style="list-style-type: none"> - Concept and properties of Division operation - Mechanism and procedures of numbers division - Facts of multiplication within 100 - Dividing even numbers of two digits on number 2 and 3

	<ul style="list-style-type: none"> - Division as opposite operation of multiplication - Dividing two -digit number by one-digit number .
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Unit (Topic)	The mathematical content of 4 th grade
The Numbers	<ul style="list-style-type: none"> - Reviewing numbers of four digits at most. - Numbers up to 7 digits: reading and writing. - Place value of Numbers consisting seven digits. - Open statements includes comparing between numbers.
Addition and subtraction Numbers	<ul style="list-style-type: none"> - Adding numbers within seven digits - Subtracting numbers within seven digits - Open statements includes addition and subtraction operations. - Application problems with two steps at most and using the strategies of estimation to judge the reasonability of the results.
Numbers Multiplication	<ul style="list-style-type: none"> - Reviewing of numbers multiplication - Numbers multiplication by 10 and 100 - Multiplication of numbers with three digits at most. - Solving problems on the fundamental operations on numbers by using strategies of estimation and rounding the numbers to verify the validity of results. - Open statements includes multiplication operation - Application problems with two steps at most and using the strategies of estimation to judge the reasonability of the results.
Measurement	<ul style="list-style-type: none"> - Reviewing to units of meter (dcm, cm). - Using (mm) in measuring the length of segments. - Measuring perimeter of triangle, square, and rectangle to one mm accuracy nearly . - Comparing between areas by using non standards units. - Converting between metric units of length: (km, m, cm and mm).
Numbers Division	<ul style="list-style-type: none"> - Multiples of numbers - Numbers Divisibility within 100 on 2, 3 and 5 - Numbers divisors - Even and odd numbers. - Division of a number within five digits at most on a number of one or two digits. - Open statements includes division operation - speed and measured by unit km/h.
Common Fractions	<ul style="list-style-type: none"> - Concepts of common Fractions, equivalent fractions, fractions of equal denominator, and comparing fractions. - addition and subtraction of common fractions with equal denominators. - addition and subtraction of common fractions with multiple denominators within 24. - Application problems with two steps at most and using the strategies of estimation to judge the reasonability of the results.
Decimal fractions	<ul style="list-style-type: none"> - Concept of decimal fraction with two decimal digits at most. - Comparing two decimal fractions. - Addition decimal fractions within two decimal digits. - subtraction decimal fractions within two decimal digits. - Application problems with two steps at most and using the strategies of estimation to judge the reasonability of the results.
Geometry	<ul style="list-style-type: none"> - Concepts of: angle and ray. - Types of angles (right, acute, obtuse), and right-angle as a measuring unit. - Triangle types with related to the angles and sides. - Solids : parallelogram, and cube - rectangle, square, parallel lines,

Content	The mathematical content of 5th grade
The Number	<ul style="list-style-type: none"> - Reviewing Numbers within 7 digits. - Numbers within 9 digits at most. - The place value of numbers within 9 digits. - Ordering Numbers.
The four basic operations on Numbers	<ul style="list-style-type: none"> - Addition and subtraction numbers within 9 digits. - Numbers multiplication by Multiple of ten (10, 100, and 1000). - Multiplication of numbers within 9 digits. - Numbers Division by Multiple of ten (10, 100, and 1000). - Numbers division on numbers of three digits at most. - Approximation and rounding numbers to 10, and to 100. - Application problems .
The Triangle	<ul style="list-style-type: none"> - Angle: measuring and types. - Sum of triangle angles, and sum of angles measures around point - Draw triangle if two angles and side given, and if given angle lies between two sides.
Theory Numbers	<ul style="list-style-type: none"> - Divisibility by 2, 3, 5, and 10, . - Common multiple and divisor. - prime numbers, and factorizing numbers . - The least common multiple for two or three numbers within three digits - the greatest common divisor for two or three numbers within three digits.
Fractions : addition and subtraction	<ul style="list-style-type: none"> - reviewing fraction - equivalent fractions - fractions reducing - fractions comparing - fractions addition - fractions subtraction - application problems
Lines and Circles	<ul style="list-style-type: none"> - Lines : parallel, perpendicular, and intersection. - Drawing parallel and perpendicular lines. - the relations between angles measurements : neighboring, Corresponding and vertically opposite in the parallelism case - Drawing the square , rectangle. - Systematic ,non systematic shapes and hexagons. - the circle: center , diameter , arc and cord .
Fractions : multiplication and division	<ul style="list-style-type: none"> - multiplying fraction with integer. - Multiplying fraction with fraction - turned over of fraction - dividing integer on fraction. - Dividing fraction on integer. - Dividing fraction on fraction. - Open sentences containing the four operations on fractions. - Application problems.
Decimals fractions: addition and subtraction	<ul style="list-style-type: none"> - Decimal fraction up to four digits place. - Decimal fractions comparing. - Decimal fractions Addition - Decimal fractions Subtraction - Application problems.
Decimal fractions: multiplication and division	<ul style="list-style-type: none"> - Multiplying decimal fraction by: 10, 100, and 1000. - Decimal fractions multiplication. - Dividing decimals fraction by: 10, 100, and 1000. - Decimal fractions division . - Converting decimal fractions to common fraction. - Application problems .
Measurement	<ul style="list-style-type: none"> - Perimeter each of rectangular and regular shapes. - the relations between metric units of areas: (m^2, cm^2, and dm^2). - Rectangle and square areas. - Speed :m/sec , m/min. - Application problems.

Content	The mathematical content of 6th grade
Number and operations	<ul style="list-style-type: none"> - Numbers within 10 digits at most. - Addition and subtraction - Multiplication and division. - Numbers approximation. - Numbers Square and cubic. - Square root for numbers of perfect square. - Cubic root for numbers of perfect cube. - Application problems.
The four basic operations on Numbers	<ul style="list-style-type: none"> - Addition and subtraction numbers within 9 digits. - Numbers multiplication by Multiple of ten (10, 100, and 1000). - Multiplication of numbers within 9 digits. - Numbers Division by Multiple of ten (10, 100, and 1000). - Numbers division on numbers of three digits at most. - Approximation and rounding numbers to 10, and to 100. - Application problems .
The Triangle	<ul style="list-style-type: none"> - Angle: measuring and types. - Sum of triangle angles, and sum of angles measures around point - Draw triangle if two angles and side given, and if given angle lies between two sides.
Theory Numbers	<ul style="list-style-type: none"> - Divisibility by 2, 3, 5, and 10, . - Common multiple and divisor. - prime numbers, and factorizing numbers . - The least common multiple for two or three numbers within three digits - the greatest common divisor for two or three numbers within three digits.
Fractions : addition and subtraction	<ul style="list-style-type: none"> - reviewing fraction - equivalent fractions - fractions reducing - fractions comparing - fractions addition - fractions subtraction - application problems
Lines and Circles	<ul style="list-style-type: none"> - Lines : parallel, perpendicular, and intersection. - Drawing parallel and perpendicular lines. - the relations between angles measurements : neighboring, Corresponding and vertically opposite in the parallelism case - Drawing the square , rectangle. - Systematic ,non systematic shapes and hexagons. - the circle: center , diameter , arc and cord .
Fractions : multiplication and division	<ul style="list-style-type: none"> - multiplying fraction with integer. - Multiplying fraction with fraction - turned over of fraction - dividing integer on fraction. - Dividing fraction on integer. - Dividing fraction on fraction. - Open sentences containing the four operations on fractions. - Application problems.
Common fractions:	<ul style="list-style-type: none"> - common fractions Addition and subtraction. - Common fractions multiplication and division. - Application problems.
Geometric shapes	<ul style="list-style-type: none"> - The quadruple shapes s and summation of angles. - Properties of quadruple related to sides , angles, and diameters. - Drawing triangle if given three sides. - Drawing parallelogram if given angle lies between two neighbor sides. - Drawing parallelogram if given two neighbor sides one diameter. - Circle and surroundings. - Drawing regular shapes inside circle as square, rectangular.
Decimals fractions:	<ul style="list-style-type: none"> - Decimal fractions Addition and subtraction. - Decimal fractions multiplication and division.

	<ul style="list-style-type: none"> - Converting decimal fractions to common fraction. - Approximation and Turning decimal fractions to one or two place value. - Application problems.
Measurement	<ul style="list-style-type: none"> - Reviewing the metric units of length - Metric units for areas. - Metric units for volume. - Liter and Mel liter to measuring the capacity. - Mass units (ton as a unit). - Temperature units. - Adding and subtraction measurement units. - Application problems.
The Area	<ul style="list-style-type: none"> - Areas of: triangle, parallelogram, and Rhombus. - Total area of cubic and rectangular solid. - Application problems.
Statistics	<ul style="list-style-type: none"> - Representing the qualitative data by tables ,pictures, and lines. - representing qualitative data using frequency tables - calculating the mean and range to a set of numbers. - Application problem.
Expression by symbols	<ul style="list-style-type: none"> - Using symbols. - Simple expressions and substitution. - Solving equation with one variable includes one of the basic operations. - Application problem.
Ratio and proportion and percentage	<ul style="list-style-type: none"> - Ratio . - Percentage . - Proportion . - Simple profit, and lost. - Taxes and almsgiving.
Solids and volumes	<ul style="list-style-type: none"> - The pyramid and the prism - Cubic volume and prism. - Application problem.

Content	The mathematical content of 7th grade
Integers numbers	<ul style="list-style-type: none"> - Integer numbers(positive and negative). - Absolute value of negative numbers. - Integer numbers comparing. - Integer numbers addition. - Integer numbers subtraction. - Integer numbers multiplication. - Integer numbers division. - Exponents. - Numbers factorizing . - Common factors : least multiple and greatest divisor. - Square root.
Rational numbers	<ul style="list-style-type: none"> - Rational number and inverse. - Rational number comparing. - Rational number addition. - Rational number subtraction. - Rational number multiplication. - Rational number division. - Square root.
Algebraic expressions and factorizing	<ul style="list-style-type: none"> - Algebraic expression and terms. - Finding the value of algebraic expression by substitution. - Algebraic expression addition and subtraction. - Simple algebraic expression multiplication. - Factorizing algebraic expressions by common factor.
Proportion	<ul style="list-style-type: none"> - Concept of proportion, Direct and inverse proportion. - Laws of proportion. - Applications on proportion.
Geometry	<ul style="list-style-type: none"> - Parallel and intersection lines, and relation between angles measures. - Summation of angles measures of closed polygon .

	<ul style="list-style-type: none"> - Cases of triangles Congruency. - Cases of triangles similarity
Groups	<ul style="list-style-type: none"> - Set and elements. - Sub-set and equal sets. - Union , intersection and subtraction of sets. - The whole set and complementary. - Properties of operations on sets. - De Morgan laws.
Construction Geometry	<ul style="list-style-type: none"> - Transfer of known angle. - Bisection given angle. - Constructing perpendicular line from point lies on line. - Constructing perpendicular line from a given point not lies on line. - Bisection segment.
Linear Equations	<ul style="list-style-type: none"> - Open statement, set of substitution, and solution set. - Solving linear equation with one variable. - Application problems includes temperature degree.
Areas and Volumes	<ul style="list-style-type: none"> - Areas of irregular shapes. - Sector area - Surface area and volume of the pyramid - Surface area and volume of the prism. - Volumes of irregular solids.
Statistics and probabilities	<ul style="list-style-type: none"> - Data representation by sectors and frequency tables. - The mean for data grouped in frequency tables. - Random experiment (sample space).

Content	The mathematical content of 8 th grade
Real numbers	<ul style="list-style-type: none"> - Numbers : rational , irrational and real. - Calculating the Square root of numbers using the general way. - The four basic operations on real numbers. - Properties of addition and multiplication on real numbers. - Laws of Exponents and roots.
Commercial treatments	<ul style="list-style-type: none"> - Insurance Calculating - legacy Calculating - Calculating commercial Discounts. - Calculating of Stocks market and bonds. - Simple and compound profit.
The triangle	<ul style="list-style-type: none"> - Properties of triangle types. - Properties of right triangle and Pythagoras theorem. - The relation between the triangle sides and angle concept and calculate the exterior angle related to the triangle. - The segment joint the vertex and chord intermediate in the right triangle.
Expressions Factorization	<ul style="list-style-type: none"> - Multiplication of two expressions. - factorizing difference between two quadratic expressions. - factorizing quadratic expression. - Application problems.
Solids	<ul style="list-style-type: none"> - Surface Area and volume of cone - Volume and surface area of cylinder. - Surface area and volume of the sphere.
Relations and functions	<ul style="list-style-type: none"> - Cartesian multiplication for a finite set - Cartesian coordinates. - Relations with finite domain and representation. - Function and representation - Linear function and graphing.
The quadrilateral shapes Equivalence	<ul style="list-style-type: none"> - Properties of quadrilateral shapes: Parallelogram, rectangle and square. - Triangles Equivalence. - Parallelogram Equivalence
Systems of Linear	<ul style="list-style-type: none"> - linear equation with two variables and graphing. - Solve linear equation with two variables by using : graphing, omitting

Equations	<ul style="list-style-type: none"> way or substitution way. - Application problems
Probability	<ul style="list-style-type: none"> - The Stability Phenomena of frequency ratio - Sample space. - Types of events. - Using principle counting. - Proprieties of probability.
Trigonometric ratios	<ul style="list-style-type: none"> - Basic trigonometric ratios: sine , cosine , tangent - of right triangular - Calculating trigonometric ratios by using tables. - Calculating angle if the trigonometric ratios are known - Application on Solving right triangle through.

Content	The mathematical content of 9th grade
Analytic Geometry	<ul style="list-style-type: none"> - The orthogonal coordinates in plane. - The distance between two points. - coordinates of a point that bisecting a straight line - straight line: slope, equation, and parallel condition. - Geometric transformation :reflections ,symmetry, rotation, and dilatation .
Factor Analysis	<ul style="list-style-type: none"> - Reviewing factorizing of quadratic expressions and difference between two squares expressions. - Analyzing expressions by square Completing. - Analyzing the summation of tow cubic expressions , and the difference between tow cubic expressions. - Reducing the Algebraic fractions. - The greatest common factor , and the least common multiple of algebraic expressions. - The four basic operations on expressions.
Circle	<ul style="list-style-type: none"> - The Central angles ,angles lies on the circle, relation between central angles and the angles lies on the same arc, and theorems related to their. - Theorems of circle chords. - Circles intersection.
Inequalities	<ul style="list-style-type: none"> - the Linear inequality of one variable - the Linear inequality of tow variables and their graphical presentation. - Solving system of linear inequality with tow variables graphing. - Applications problems on linear inequality with tow variables.
Equations	<ul style="list-style-type: none"> - Linear and quadratic functions. - Solving the quadratic equation by: analysis factors, general law, and graphing. - Solving fractions equations. - Application problems.
The circular shapes	<ul style="list-style-type: none"> - Circle tangents and their theorems. - The circular Quadrilateral shapes and properties. - Drawing triangle in side a circle. - Drawing circle inside a triangle.
Trigonometry	<ul style="list-style-type: none"> - Trigonometric ratios. - The relations between the basic trigonometric ratios. - The Trigonometric ratios of the angle 30,45, 60. - Calculating trigonometric ratios for acute angle if one known. - Using tables of trigonometric ratios. - Solving the right triangle. - Simple Trigonometric equations.
Statistics	<ul style="list-style-type: none"> - Exponentials and applications on small and large numbers. - Representing statistical data by: frequency tables, histogram and frequency polygon. - Tendency measurements ,The mean, median and mode. - Calculating the measures of center for values given, and for frequency tables.

	- The shape of frequency distribution.
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Content	The mathematical content of 10th grade
Periodic Functions	<ul style="list-style-type: none"> - Angles measuring (radian, and gradient). - Periodic functions. - Sine and cosine graphical representing (capacity and period). - The circular arc length.
Analytic Geometry	<ul style="list-style-type: none"> - The forms of straight line equation. - The perpendicular lines. - The distance between point and line. - Circle equation. - Geometric transformation.
Polynomials functions	<ul style="list-style-type: none"> - Polynomial definition. - Division operation on Polynomials. - The synthetic division method. - Remainder theorem and Polynomials zeros.
Relations and Functions	<ul style="list-style-type: none"> - The Cartesian products. - Relations and types. - Functions and types. - The four basic operations on functions. - Composition of functions.
Trigonometry	<ul style="list-style-type: none"> - Trigonometry ratios of compound angles. - Trigonometry ratios of multiple and half angles. - The area of triangle, sector and circular segment. - Trigonometric equations. - Trigonometric Identities.
The Space Geometry	<ul style="list-style-type: none"> - Planes and Lines. - Parallel and perpendicular lines. - Parallel and perpendicular planes. - The angle of intersection of two planes. - The orthogonal projection - The skew lines.
Equations systems	<ul style="list-style-type: none"> - Solving equation with one variable. - Solving a system of three linear equations. - Solving a system of equations :one is linear and the other quadratic. - Solving a system of quadratic equations whenas the solution end to linear equations.
Statistics	<ul style="list-style-type: none"> - Data dispersion through frequency distribution curves. - Deviation measurements :the range and the standard deviation. - Effect of linear transformation on measurements of tendency and deviation.

Secondly: Mathematics Curriculum for secondary stages (11 to 12 grades).

The curriculum document of mathematics for secondary stages (M.O.E, 1993) includes the following aspects;

- The first part: Mathematics Curricula for secondary Stage.
- The mathematical topics (instructional units) for grades of stage.
- The instructional units for 11th grade according to the kind of education.
- The instructional units for 12th grade according to the kind of education.
- The general Methods in Evaluation.
- Table of distributing periods for secondary grades

The second part: the guide line of mathematics curriculum in the secondary Stage, which includes on seven guidelines represented with: general basic for curriculum of secondary education, general learning objectives, instructional plan through the grades, mathematical topics of content for grades, General Suggestions for methods of teaching mathematics, General Suggestions for evaluation, and the specification of the textbooks.

2.1 The learning objectives of teaching mathematics for the secondary stage.

The mathematics curriculum for secondary stage includes on the following learning objectives:

- To enhance and deep mathematical communication skills and the ability to express ideas clearly and accurately.
- To develop the ability to reason and draw objective conclusions.
- To develop the sense of exploration, innovation and self-confidence.
- To develop the skill of identifying variables in different situations,
- To recognize and understand the relations between the variables and connecting them to draw conclusions, and decisions .
- To provide students with skills needed in other fields of knowledge.
- To provide them with skills needed to pursue higher education.
- To provide them with skills needed to comprehend physical and social phenomena and keep abreast of technological developments.
- To develop their ability to understand their physical surroundings.
- To develop their ability to design mathematical modules that reflect the situations of real life.
- To develop their ability to savor and enjoy mathematics.
- To develop positive attitudes towards desired values such as accuracy, order, objectivity, patience and respect for differing opinions.

2.2.2 The mathematical content of teaching mathematics for the Secondary stage.

This stage includes on two grades , represented with, the first secondary grade, and the second secondary grade, also, the curriculum document includes on mathematical content for scientific, literary and branches of vocational education, the content organize in tables for these grades, as follow:

Content	The content of 11 th grade (the first Scientific grade)	The content of 12 th grade (the second Scientific grade)
Algebra	<ul style="list-style-type: none"> Real numbers - Properties of Order relation. - Limited Intervals and unlimited and representation on line numbers. - Solving linear equations and inequalities. - absolute value. - Exponential and logarithms - Exponential function. - Concept of logarithms - Logarithm function - Logarithms laws. - Using logarithms tables to finding common logarithms. - Matrices and determinates - Matrix and determinate. - Solving linear equations using determinates. - Operations on matrices. - Unity and inverse of matrices. - Counting principles and binomial theory - Counting techniques. - Permutations - Combinations - Binomials theory - Sequences and series - sequence and series, and unlimited - Arithmetic sequence and series. - Geometrical sequence and series. - unlimited geometrical series. 	<ul style="list-style-type: none"> - Complex numbers - Represent complex number by symbol and formula - operations on complex numbers. - square root of complex numbers - solving equation using complex number system. - Representing complex numbers using Polar coordinate -
Geometry	<ul style="list-style-type: none"> Vectors in space - Cartesians coordinates in space. - Vectors - Dot product of vectors. - Cross product of vectors - Application on vector space 	<ul style="list-style-type: none"> - conic sections - Concept of conic sections: - Parabola , standards parametric equations and properties. - Ellipse standards parametric equations and properties. - Hyperbola standards parametric equations and properties. - Solving problems by using the standard forms of conic sections. - polar coordinates
Trigonometry	<ul style="list-style-type: none"> - Trigonometry - trigonometric laws of transfer multiplication to addition and subtraction. - trigonometric laws of transfer addition and subtraction to multiplication . - trigonometric identities - Solving trigonometry equations. 	<ul style="list-style-type: none"> - sine law, and cosine law - solving the triangles in general - Solving applications in two and three dimension among its.
Statistics and probability	<ul style="list-style-type: none"> - Statistics - Samples and methods of selecting - Normal distribution - Correlation - Regressions - Index numbers 	<ul style="list-style-type: none"> - concept of probability and their laws. - condition probability and independent probability distribution - random variable and function of density probability - compute expectation and solving

		problems
Calculus		limits and continuity - limits at point - theorems in limits - continuous and theorems. - Properties of continuous functions. - differentiation - differentiation - average rate - derivative - rules of derivative - higher derivatives - velocity and acceleration - chain rule derivative - periodic functions derivative - implicit derivatives - application on differentiation - related rates applications - intermediate-value theorem. - First derivative (periods of increasing and decreasing functions) applications. - local extreme values of functions (maximums and minimums values). - Second derivative and applications (periods of concave up and down of functions). - Real life applications on local extreme values. - Integration and application - limited integration and properties. - The fundamental theorem in Differentiation and Integration. - Unlimited integration - integration of logarithmic and exponential functions. - Methods of integration. - Applications on integration.

Content	The content of 11 th grade (the first literary grade)	The content of 12 th grade (the second literary grade)
Algebra	- Exponential and logarithms - Matrices and determinates - Counting principles and binomial theory	== === =====
Statistics and probability	- Normal distribution - Conditional probability and independency	== === =====
Calculus	- Differentiation and application - average rate - derivative - rules of derivative - higher derivatives - chain rule derivative - local extreme values of functions (maximums and minimums values). - Real life applications on local extreme values. - Integration and application - limited integration - properties of limited integration.	== === =====

	<ul style="list-style-type: none"> - Integration by substitutive way. - Founding the area between two curves of functions. 	
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Content	The content of 11th grade (the first vocational/ Industry grade)	The content of 12th grade (the second vocational/ Industry grade)
Algebra	Basic subjects (compulsory) - Real numbers - Exponential and logarithms - Sequences and series	Basic subjects (compulsory) === =====
	Basic subjects (selection or additional) - Matrices and determinates - Counting principles and binomial theory	Basic subjects (selection or additional) === =====
Geometry	Basic subjects (compulsory) =====	Basic subjects (compulsory) === =====
	Basic subjects (selection or additional) - Vector space in the plane, and space. - Application on vector space	Basic subjects (selection or additional) - conic sections
Trigonometry	Basic subjects (compulsory) - Solving triangle in general	Basic subjects (compulsory) ==== =====
	Basic subjects (selection or additional) - identities and trigonometry equations. - Application problems in three dimensions	Basic subjects (selection or additional) =====
Statistics and probability	Basic subjects (compulsory) - Samples and methods of selecting - Correlation and regressions - Index numbers	Basic subjects (compulsory) === == =====
	Basic subjects (selection or additional) - Probability and laws - condition probability and independent	Basic subjects (selection or additional) - probability distribution - random variable and expectation
Calculus	Basic subjects (compulsory) =====	Basic subjects (compulsory) - limits and continuity - differentiation and interpreting derivative. - Integration and area.
	Basic subjects (selection or additional) =====	Basic subjects (selection or additional) - Application on differentiation and integration.

Content	The content of 11th grade (the first vocational/ Hotel grade)	The content of 12th grade (the second vocational/ Industry grade)
Algebra	Basic subjects (compulsory) - Exponential and logarithms - Sequences and series	Basic subjects (compulsory) === =====
	Basic subjects (selection or additional) - Real numbers - Matrices and determinates - Counting principles and binomial theory	Basic subjects (selection or additional) === =====
Geometry	Basic subjects (compulsory) =====	Basic subjects (compulsory) === =====

	Basic subjects (selection or additional) =====	Basic subjects (selection or additional) - conic sections
Trigonometry	Basic subjects (compulsory) - Solving triangle in general	Basic subjects (compulsory) =====
	Basic subjects (selection or additional) - identities and trigonometry equations. - Application problems.	Basic subjects (selection or additional) =====
Statistics and probability	Basic subjects (compulsory) - Samples and methods of selecting - Correlation and regressions - Index numbers	Basic subjects (compulsory) =====
	Basic subjects (selection or additional) - Probability and laws - condition probability and independent	Basic subjects (selection or additional) - probability distribution - random variable and expectation
Calculus	Basic subjects (compulsory) =====	Basic subjects (compulsory) - limits and continuity - differentiation and interpreting derivative. - Integration and area.
	Basic subjects (selection or additional) =====	Basic subjects (selection or additional) • Application on differentiation and integration.

Content	The content of 11 th grade (the first vocational/ Agriculture grade)	The content of 12 th grade (the second vocational/ Industry grade)
Algebra	- Exponential and logarithms - Sequences and series	=====
Trigonometry	- Trigonometry laws - Solving triangle in general -	=====
Statistics and probability	- Samples and methods of selecting - Correlation and regressions - Index numbers	=====