

## Appendix (5)

The mathematical content Analysis of mathematics curriculum for the **first grade** in light of the standards of content among the sub-periods of development.

Standards / Periods	The first period (1964 – 1972 )	The second period (1972 – 1987 )	The third period (1987 – 1999 )
<b>Number and Operations</b>	<ul style="list-style-type: none"> <li>- Reading and writing natural numbers from 1 to 20.</li> <li>- Figures of numbers and ordered numeration.</li> <li>- The concepts of addition and subtraction within 20.</li> <li>- Using facts of addition and subtraction within 20 to solve mathematical problems.</li> <li>- Using illustrative figures for numerating and arithmetic Operations.</li> </ul>	<ul style="list-style-type: none"> <li>- Set – one to one corresponding</li> <li>- greater that (! ) ,and less than ( )</li> <li>- equivalent and non equivalent sets,</li> <li>- The concept and sign of addition and subtraction (+), (-) and sign =</li> <li>- Facts of addition and subtraction within 99.</li> <li>- Adding and subtracting two digits of numbers without carrying and without borrowing .</li> <li>- Place value and the base-ten number system.</li> <li>- Connect number word and numerals to the quantities they represent.</li> <li>- Concepts of the fractions: half (1/2) and quarter (1/4) and representing.</li> </ul>	<ul style="list-style-type: none"> <li>- Concept of the number reading, writing and counting.</li> <li>- Connect number word and numerals to the quantities they represent.</li> <li>- The place values of numbers 11 to 99.</li> <li>- Ordering numbers up to 99.</li> <li>- Facts of addition and subtraction within 18 by carrying and borrowing.</li> <li>- facts of addition and subtraction without carrying and borrowing within 99.</li> <li>- The concept and sign of addition and subtraction (+), (-) and sign = .</li> <li>- Comparing numbers by using greater(! ) and smaller relations( ).</li> <li>- Concept of Fractions: <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math> without writing.</li> </ul>
<b>Algebra</b>	-----	<ul style="list-style-type: none"> <li>- The Commutative property on addition</li> </ul>	<ul style="list-style-type: none"> <li>- facts of addition and commutative property.</li> <li>- Ordering numbers (0 to 9) through objects by size.</li> </ul>
<b>Geometry</b>	-----	<ul style="list-style-type: none"> <li>- Name and Recognize : triangle, square, rectangle and circle shapes.</li> </ul>	<ul style="list-style-type: none"> <li>- Recognizing and naming the shapes of the: Sphere, rectangular solid, rectangle and circle.</li> </ul>
<b>Measurement</b>	<ul style="list-style-type: none"> <li>- Identifying measurement units: money, weight, time and length.</li> </ul>	<ul style="list-style-type: none"> <li>- Money : dinar and pence</li> <li>- Foot and span.</li> <li>- Week days</li> <li>Volume : cup and glass</li> </ul>	<ul style="list-style-type: none"> <li>- Length : using non standards units to measure some lengths.</li> <li>- Time : day as a unit of time, and week days.</li> </ul>
<b>Data Analysis and Probability</b>	-----	-----	-----

The content of the first column is listed in appendix (10) “Principles and Standards of NCTM” (NCTM, 2000).

The mathematical Content Analysis of mathematics curriculum for the **Second grade** in light of the standards of content among the sub-periods of development

Standards / Periods	The first period (1964 – 1972 )	The second period (1972 – 1987 )	The third period (1987 – 1999 )
<b>Number and Operations</b>	<ul style="list-style-type: none"> <li>- Natural numbers: reading and writing natural numbers within 100.</li> <li>- Figures of numbers within 100.</li> <li>- Recognizing the significance of +, -, =.</li> <li>- Facts of addition and subtraction within 100.</li> <li>- The concepts of multiplication and division within 50.</li> <li>- Using rules of multiplication to solve mathematical and practical problems.</li> <li>- Using illustrative figures to realize the idea of fractions.</li> </ul>	<ul style="list-style-type: none"> <li>- The concepts of numbers from 0 to 999: reading, counting and writing.</li> <li>- Place value and the base-ten number system.</li> <li>- Adding and subtracting two digits of numbers without carrying and without borrowing .</li> <li>- Adding numbers horizontally and vertically within 999 by carrying .</li> <li>- Subtracting numbers horizontally and vertically within 999 by borrowing .</li> <li>- Facts of addition and subtraction within 999.</li> <li>- Connect number word and numerals to the quantities they represent.</li> <li>- the concept and sign of multiplication as a process repeated of addition.</li> <li>- fact of multiplication within 50</li> <li>- properties of the 0 and 1 in multiplication operation</li> <li>- Division as opposite operation of multiplication</li> <li>- concepts of Fractions: <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{3}{4}</math> reading and writing and representing.</li> </ul>	<ul style="list-style-type: none"> <li>- Reviewing The concepts of numbers up to 99: reading, counting, writing and ordering.</li> <li>- Reading, counting and writing numbers with three digits up to 999</li> <li>- Place value of numbers within 999.</li> <li>- Analyzing numbers of three digits to component as a combination and finding the place value for numbers (units, tens and hundreds).</li> <li>- The concepts of addition and subtraction within 999.</li> <li>- Facts of addition within 999 by carrying.</li> <li>- Facts of subtraction within 999 by borrowing.</li> <li>- Solving problems with one step on addition and subtraction.</li> <li>- the concept and sign of multiplication as a process repeated of addition.</li> <li>- Concept of Multiplication as repeating of addition</li> <li>- Commutative property through numerical examples</li> <li>- fact of multiplication within 25</li> <li>- Solving problems with one step on facts of multiplication.</li> <li>- Concept and sign of division .</li> <li>- Concept of division as divided the sets to equivalent parts.</li> <li>- Facts of division operation within 25.</li> <li>- The relation between multiplication and division.</li> <li>- Solving problems with one step on Division.</li> <li>- concepts of Fractions: <math>\frac{1}{2}</math> , <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, <math>\frac{2}{3}</math>, <math>\frac{2}{4}</math>, <math>\frac{3}{4}</math> reading and writing.</li> </ul>

<b>Algebra</b>	-----	<ul style="list-style-type: none"> <li>- concepts of even and odd numbers within 10.</li> <li>- the summation of two even numbers is again an even number</li> <li>- the summation of two odd numbers is an even number</li> <li>- The Commutative property on multiplication.</li> </ul>	- concepts of Even and odd numbers within 20.
<b>Geometry</b>	-----	<ul style="list-style-type: none"> <li>- concepts of the square and rectangle</li> <li>- constructing the geometrical shapes by cutting.</li> </ul>	<ul style="list-style-type: none"> <li>- to recognize on the concepts and shape of the cylinder, cone and cube</li> <li>- to recognize on the concepts and shape of triangle and square</li> <li>- symmetrical the geometrical shapes experimentally .</li> </ul>
<b>Measurement</b>	<ul style="list-style-type: none"> <li>- Using measurement units to solve mathematical problems.</li> </ul>	<ul style="list-style-type: none"> <li>- Money : dinar and half, and quarter</li> <li>- Time :Reading the hours</li> <li>- Week days, and months</li> <li>- Length : meter</li> </ul>	<ul style="list-style-type: none"> <li>- To recognize on the meter and centimeter</li> <li>- Money: dinar, half and quarter .</li> <li>- Month as unit of time, and relations with year and seasons.</li> <li>- O'clock: reading in half and quarter.</li> </ul>
<b>Data Analysis and Probability</b>	-----	-----	-----

The mathematical Content Analysis of mathematics curriculum for **the third grade** in light of the standards of content among the sub-periods of development

<b>Standards / Periods</b>	<b>The first period (1964 – 1972 )</b>	<b>The second period (1972 – 1987 )</b>	<b>The third period (1987 – 1999 )</b>
<b>Number and Operations</b>	<ul style="list-style-type: none"> <li>- Reading and writing natural numbers within 1000.</li> <li>- Decimal representation in base 10.</li> <li>- Facts of addition and subtraction within 1000.</li> <li>- Multiplication and division within 1000.</li> <li>- Multiplying numbers by multiples of ten.</li> <li>- Dividing numbers within 1000 by multiples of ten.</li> <li>- Using the facts of operations on numbers to solve mathematical and practical problems.</li> <li>- Understanding the concepts of fractions using objects representations.</li> </ul>	<ul style="list-style-type: none"> <li>- concepts of Numbers within 9999 reading, writing, ordering and counting.</li> <li>- the place values of numbers to the base-ten system.</li> <li>- Facts of Adding numbers within (9999).</li> <li>- Facts of Subtracting numbers within (9999).</li> <li>- Concept and properties of multiplication and Division operations</li> <li>- Facts of multiplication up to <math>5 \times 10</math></li> <li>- Facts of division up to <math>5 \times 10</math></li> <li>- Facts of multiplication within 100</li> <li>- Facts of division within 100</li> <li>- Division as opposite operation of multiplication</li> </ul>	<ul style="list-style-type: none"> <li>- Reviewing numbers within 999: reading , writing, comparing and ordering.</li> <li>- the place values of numbers to the base-ten system.</li> <li>- Numbers: Reading, writing, comparing and ordering within 9999 using the symbols( )and(!) .</li> <li>- Facts of Adding numbers within (9999).</li> <li>- Facts of Subtracting numbers within (9999)</li> <li>- Solving application problems using the fundamental operations within (9999).</li> <li>- Counting using multiple of numbers up to ten times.</li> </ul>

	<ul style="list-style-type: none"> <li>- Reading and writing and comparing fractions <math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math> <math>\frac{1}{5}</math>.</li> </ul>	<ul style="list-style-type: none"> <li>- Numbers Multiplication with multiples of ten within 100</li> <li>- Multiplication of two –digit number by a two-digit number with and without carrying.</li> <li>- Dividing two or three-digit number by one-digit number (with and without remainder).</li> <li>- Numbers Division with multiples of ten within 100.</li> <li>- The concepts of common fractions</li> <li>- reading and writing common fractions with denominator less than or equals 8 ,</li> <li>- equivalent fractions .</li> </ul>	<ul style="list-style-type: none"> <li>- Facts of multiplication tables up to <math>10 \times 10</math></li> <li>- Division as opposite operation of multiplication</li> <li>- Concept ,Mechanism and procedures of Division operation.</li> <li>- Multiplication and division of two –digit number by one-digit number.</li> <li>- Multiplication of two –digit number by a two-digit number</li> <li>- Dividing even numbers of two digits on number 2 and 3.</li> <li>- Reviewing fractions: <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{3}{4}</math>, <math>\frac{1}{3}</math>, <math>\frac{2}{3}</math>,</li> <li>- Fractions with denominators 6</li> <li>- Fractions with denominators 8</li> <li>- Fractions with denominators up to 10.</li> </ul>
<b>Algebra</b>	-----	-----	<ul style="list-style-type: none"> <li>- Commutative property on numbers multiplication.</li> </ul>
<b>Geometry</b>	<ul style="list-style-type: none"> <li>- Recognizing on the shapes of circle, half circle, square and rectangle.</li> </ul>	<ul style="list-style-type: none"> <li>- Concepts : point, line, segment, ray, kinds of angles(right, acute, obtuse), kinds of triangles, quadrilateral parallelogram, rectangle, square, parallel lines,</li> <li>- the right angle as a unit to find the sum of the angles of a triangle and quadrilateral figures</li> <li>- Categorize the geometrical figures in light of the properties of shapes.</li> </ul>	<ul style="list-style-type: none"> <li>- Concepts : point, line, segment</li> <li>- Drawing the segment</li> <li>- Properties of triangles, rectangle, square an drawing the shapes.</li> </ul>
<b>Measurement</b>	<ul style="list-style-type: none"> <li>- Recognizing the relationships between measurement units:</li> <li>- Money : dinar and half, and quarter</li> <li>- Time : period of lesson started, and lunch.</li> <li>- Week days, and months</li> <li>- Length : meter</li> <li>- Using the relationships between measurement units to solve mathematical problems.</li> </ul>	<ul style="list-style-type: none"> <li>- Wight: kg, half kg and gram</li> <li>- Money : dinar and fells</li> <li>- Time : year, month, week, hour and parts</li> <li>- Length : meter, cm, mm and km</li> <li>- Relation ships between the units.</li> </ul>	<p>Measurement units of :</p> <ul style="list-style-type: none"> <li>- Wight: kg and relation with gram</li> <li>- Money : relations between units of Dinar.</li> <li>- Time : reading the time (hours ).</li> <li>- Length :kilometer, cm, mm</li> <li>- Relation between km and the units</li> <li>- Using non standards measurements</li> <li>- Application problems.</li> </ul>
<b>Data Analysis and Probability</b>	-----	-----	-----

The mathematical Content Analysis of mathematics curriculum for the **Fourth grade** in light of the standards of content among the sub-periods of development.

Standards / Periods	The first period (1964 – 1972 )	The second period (1972 – 1987 )	The third period (1987 – 1999 )
<b>Number and Operations</b>	<ul style="list-style-type: none"> <li>- Reading and writing numbers up to 10,000.</li> <li>- Developing reading and writing numbers up to a million.</li> <li>- Using facts of the fundamental operations within million.</li> <li>- The concepts of common fractions, reading and writing fractions and mixed numbers (fraction and number).</li> <li>- Addition and subtraction of common fractions.</li> <li>- Converting mixed numbers into fractions and vice versa.</li> <li>- Decimal fractions: the concepts of decimal fraction: the concepts decimal fraction writing decimal fractions up to three decimal places.</li> <li>- Addition and subtraction within three decimal places.</li> </ul>	<ul style="list-style-type: none"> <li>- Numbers up to 7 digits: reading and writing.</li> <li>- Place value of Numbers consisting seven digits.</li> <li>- Addition and subtraction of numbers with (10 000) horizontally and vertically.</li> <li>- Multiplication of numbers with seven digits at most.</li> <li>- Division of a number within seven digits by a number of two or three digits.</li> <li>- Reducing Fractions using common factors.</li> <li>- Concept and Applying divisibility by 2 , 3, and 5 to reduce fractions.</li> <li>- Concepts of common Fractions, equivalent fractions, fractions of equal denominator addition and subtraction of identical common fractions.</li> <li>- addition and subtraction of common fractions with common denominator less than or equals 24.</li> <li>- The concept of decimal fraction, writing decimal fractions of three decimal places.</li> <li>- Addition and subtraction of decimal fractions.</li> <li>- Converting decimal fractions into common fractions.</li> </ul>	<ul style="list-style-type: none"> <li>- Numbers up to 7 digits: reading and writing.</li> <li>- Place value of Numbers consisting seven digits.</li> <li>- Adding and Subtracting numbers within seven digits.</li> <li>- Numbers multiplication by 10 and 100</li> <li>- Multiplication of numbers with three digits at most.</li> <li>- Division of a number within five digits at most on a number of one or two digits.</li> <li>- Solving application problems includes fundamental operations with two steps at most.</li> <li>- Using strategies to estimate the results on numbers computations and to judge validity of such results through solving the problems.</li> <li>- Concepts of common Fractions, equivalent fractions, fractions of equal denominator, and comparing fractions.</li> <li>- addition and subtraction of common fractions with equal denominators.</li> <li>- addition and subtraction of common fractions with multiple denominators within 24.</li> <li>- Concept of decimal fraction with two decimal digits at most.</li> <li>- Comparing two decimal fractions.</li> <li>- Addition and subtraction decimal fractions within two decimal digits.</li> </ul>
<b>Algebra</b>	-----	<ul style="list-style-type: none"> <li>- Even and odd numbers.</li> <li>- Factors and number multiples.</li> <li>- founding the greatest and the lower common divisor of two numbers or more than.</li> </ul>	<ul style="list-style-type: none"> <li>- Open statements includes comparing between numbers.</li> <li>- Open statements includes fundamental operations.</li> <li>- Numbers Multiples and Divisibility within 100 on 2, 3 and 5</li> <li>- Even and odd numbers.</li> </ul>

			- speed and measured by unit km/h.
<b>Geometry</b>	<ul style="list-style-type: none"> <li>- Drawing lines and elementary geometric figures (the square and rectangle) using the ruler and graph paper.</li> </ul>	<ul style="list-style-type: none"> <li>- Concepts of: line, line segment, ray, angle, types of angles (right, acute, obtuse), right-angle triangle, quadrilateral parallelogram, rectangle, square, parallel lines,</li> <li>- the right angle as a unit to find the sum of the angles of a triangle and quadrilateral figures.</li> <li>- Drawing square and rectangle shapes</li> <li>- The concepts of area and perimeter for square and rectangle</li> <li>- calculating the area and perimeter of geometrical figures</li> <li>- the generalization related to the relation between the lines and angles.</li> <li>- Properties of square , rectangle and parallelogram</li> </ul>	<ul style="list-style-type: none"> <li>- Concepts of: angle and ray.</li> <li>- Types of angles (right, acute, obtuse), and right-angle as a measuring unit.</li> <li>- Triangle types with related to the angles and sides.</li> <li>- Solids : parallelogram, and cube</li> <li>- rectangle, square, parallel lines,</li> </ul>
<b>Measurement</b>	<ul style="list-style-type: none"> <li>- Using units of measurement (length, money, and weight units) to solve practical problems involving decimal fractions.</li> <li>- Reading the time (hour) within quarter and third of hour.</li> </ul>	<ul style="list-style-type: none"> <li>- units of Meter and relations between parts.</li> <li>- money , dinar and his parts as introduction to concept of decimal fraction.</li> </ul>	<ul style="list-style-type: none"> <li>- Reviewing to units of meter (dcm, cm).</li> <li>- Using (mm) in measuring the length of segments.</li> <li>- Measuring perimeter of triangle, square, and rectangle to one mm accuracy nearly .</li> <li>- Comparing between areas by using non standards units.</li> <li>- Converting between metric units of length: (km, m, cm and mm).</li> </ul>
<b>Data Analysis and Probability</b>			

The mathematical content Analysis of mathematics curriculum for the **Fifth grade** in light of the standards of content among the sub-periods of development.

Standards / Periods	The first period (1964 – 1972 )	The second period (1972 – 1987 )	The third period (1987 – 1999 )
<b>Number and Operations</b>	<p>Numbers:</p> <ul style="list-style-type: none"> <li>- divisibility by 2,3,5,9 and 10.</li> <li>- Prime number: prime numbers up to 100.</li> </ul> <p>Factors of the numbers.</p> <ul style="list-style-type: none"> <li>- Factorization of numbers: writing numbers (up to 100) as products of prime numbers.</li> <li>- The concepts of multiples, the common factors, the least common multiple.</li> <li>- Using factorization to find out the common multiple of numbers.</li> </ul> <p>Common fractions:</p> <ul style="list-style-type: none"> <li>- concept of Common fractions: and reduction fractions,</li> <li>- addition common fractions using the method of the least common denominator.</li> <li>- subtraction common fractions using the method of the least common denominator.</li> <li>- Multiplying common fractions with integer.</li> <li>- Multiplying two common fractions.</li> <li>- Division of integer number on common fractions.</li> <li>- Division of common fractions on integer number.</li> <li>- Dividing two common fractions.</li> <li>- Solving problems involving common fractions.</li> </ul> <p>Decimal fractions:</p> <ul style="list-style-type: none"> <li>- the concept of decimal fractions, converting decimal fractions into common fractions.</li> <li>- Multiplication decimal fractions by multiples of ten.</li> <li>- Division of decimal fractions on multiples of ten.</li> </ul>	<ul style="list-style-type: none"> <li>- Concepts of Natural numbers up to <math>(10)^9</math>.</li> <li>- reading, writing and ordering numbers.</li> <li>- The four fundamental arithmetic operations on natural numbers.</li> <li>- Division of number by divisors consisting of more than two digits.</li> <li>- Concepts of Common fractions, equivalent fractions, ordering of common fractions.</li> <li>- The four fundamental arithmetic operations on common fractions.</li> <li>- Concept of decimal fractions, periodic fraction</li> <li>- decimal fractions: reading and writing decimal fractions,</li> <li>- Approximation to one digit</li> <li>- the four fundamental arithmetic operations on decimal fractions.</li> <li>- Converting common fractions into decimal fractions and vice versa.</li> </ul> <p>Solving problems on numbers, fractions and Checking the validity of solutions for problems involving the four fundamental operations.</p> <ul style="list-style-type: none"> <li>- Divisibility by 4, 6, 9 and 10.</li> <li>- Numbers factorizing.</li> <li>- The greatest common divisor of two or three numbers</li> <li>- the least common multiple, of two or three numbers.</li> </ul>	<ul style="list-style-type: none"> <li>- Numbers within 9 digits at most.</li> <li>- The place value of numbers within 9 digits.</li> <li>- Reading writing, comparing and Ordering Numbers within 9 digits.</li> <li>- Addition and subtraction numbers within 9 digits.</li> <li>- Numbers multiplication and division by Multiple of ten (10, 100, and 1000).</li> <li>- Multiplication and division of numbers within 9 digits.</li> <li>- Solving Application problems by using Approximation and rounding numbers and estimation to check the validity of results.</li> <li>- Divisibility by 2, 3, 5, and 10, .</li> <li>- Common multiple and divisor.</li> <li>- prime numbers, and factorizing numbers .</li> <li>- The least common multiple for two or three numbers within three digits</li> <li>- the greatest common divisor for two or three numbers within three digits.</li> <li>- Multiplying and dividing fraction with integer number.</li> <li>- Rounding over of fraction</li> <li>- Multiplying and dividing two fraction.</li> <li>- concept of :Decimal fraction up to four digits place, reading ,writing equivalent fractions, comparing and reducing fractions .</li> <li>- Decimal fractions Addition and Subtraction.</li> <li>- Decimal fractions multiplication and division.</li> <li>- Multiplying and Dividing decimals fraction by: 10, 100, and 1000.</li> <li>- Converting decimal fractions to common fraction.</li> </ul>

			<ul style="list-style-type: none"> <li>- Application problems on fundamental operations number and fractions.</li> </ul>
<b>Algebra</b>	-----	<ul style="list-style-type: none"> <li>- Commutative , associate and distribution properties.</li> </ul>	<ul style="list-style-type: none"> <li>- Open sentences containing the four operations on fractions.</li> </ul>
<b>Geometry</b>	<ul style="list-style-type: none"> <li>- The straight line, measuring the straight line practically, bisect the straight line by means of measurement.</li> <li>- Using geometry tools to draw geometric figures and use measurements to compare them.</li> <li>- The concept of angles.</li> <li>- Drawing elementary geometric figures: circles, square, and rectangle using geometry tools .</li> <li>- Triangle: six elements, types related to the sides and angles.</li> <li>- Drawing the triangle if given: three sides, or two sides and angle , or two angles and one side.</li> </ul>	<ul style="list-style-type: none"> <li>- Concepts of: Angles, measuring angles. Line segment, parallel and perpendicular lines.</li> <li>- Drawing lines , triangle , square, rectangle and parallelogram Using ruler, protractor and compasses,</li> <li>- properties of the parallelogram.</li> <li>- Circles parts of circle: center, diameter, radius and chord.</li> <li>- Identifying the dimensions of cube and rectangular solid</li> <li>- finding their volume and total surface area of cube.</li> <li>- Relation and laws of finding the areas of given geometrical figures: square, rectangle and parallelogram.</li> <li>- Solve practical problems on areas of geometrical figures</li> </ul>	<ul style="list-style-type: none"> <li>- Angle: measuring and types.</li> <li>- Sum of triangle angles, and sum of angles measures around point</li> <li>- Draw triangle if two angles and side given, and if given angle lies between two sides.</li> <li>- Lines : parallel, perpendicular, and intersection.</li> <li>- Drawing parallel and perpendicular lines.</li> <li>- the relations between angles measurements : neighboring, Corresponding and vertically opposite in the parallelism case</li> <li>- Drawing the square , rectangle.</li> <li>- Systematic ,non systematic shapes and hexagons.</li> <li>- the circle: center , diameter , arc and cord .</li> </ul>
<b>Measurement</b>	<p>Areas:</p> <ul style="list-style-type: none"> <li>- the concept of area according the geometrical shapes through counting the numbers of squares.</li> <li>- metric system of area: <math>m^2</math> , <math>cm^2</math>, donm(1000 <math>m^2</math>).</li> <li>- Using geometric formulas to find the areas of square and rectangle..</li> </ul> <p>Volumes:</p> <ul style="list-style-type: none"> <li>- the concept of volume and amplitude, metric system of volume: <math>m^3</math>, <math>cm^3</math>.</li> <li>- Calculating the volumes of rectangular solid and cube.</li> </ul>	<ul style="list-style-type: none"> <li>- Concepts of area, surface area, total area, and using square unit and relations among units as a measurements units of area.</li> </ul>	<ul style="list-style-type: none"> <li>- Perimeter each of rectangular and regular shapes.</li> <li>- the relations between metric units of areas: (<math>m^2</math>, <math>cm^2</math>, and <math>dm^2</math>).</li> <li>- Rectangle and square areas.</li> <li>- Speed :m/sec , m/min.</li> <li>- Application problems.</li> </ul>
<b>Data Analysis and Probability</b>	-----	-----	-----



The mathematical content Analysis of mathematics curriculum for the **sixth grade** in light of the standards of content among the sub-periods of development.

Standards / Periods	The first period (1964 – 1972 )	The second period (1972 – 1987 )	The third period (1987 – 1999 )
<b>Number and Operations</b>	<ul style="list-style-type: none"> <li>- Calculating the Arithmetic average of numbers,</li> <li>- squares of numbers up to 10.</li> <li>- finding out the square roots of numbers by means of factorization. Proportion.</li> <li>- the meaning of proportion, percentage,</li> <li>- converting, percentages into common and decimal fractions.</li> <li>- Simple profit, proportional division</li> <li>- Solving application problems simple profit and proportional.</li> </ul>	<ul style="list-style-type: none"> <li>- Concept of solving problem</li> <li>- Steps of solving problems</li> <li>- Analyzing the problems, identified the known and unknown data</li> <li>- Plan of solution.</li> <li>- Checking the validity of solution</li> <li>- Concepts of : Factors and multiples of number, square and cubic root,.</li> <li>- Number square and cube (1 to 5)</li> <li>- finding the square roots and cube roots of numbers</li> <li>- Factorization of number and writing it as a product of prime numbers</li> <li>- Numbers analyzing to the factors</li> <li>- approximating numbers to three decimal places</li> <li>- Concepts of: Ratio, percentage, simple and compound profit, tax, proportional</li> <li>- Using properties of Proportion in solving problems,</li> <li>- Changing the ratio to the percentage</li> <li>- Arithmetic average, and rates related to time</li> <li>- Daily problems involving saving, banking, taxes and discount.</li> <li>- Using concept of scale in minimize and maximize.</li> </ul>	<ul style="list-style-type: none"> <li>- Numbers within 10 digits at most.</li> <li>- Facts of Addition, subtraction Multiplication and division within 9 digits.</li> <li>- Numbers multiplication and Division by Multiple of ten (10, 100, and 1000).</li> <li>- Numbers division on numbers of three digits at most.</li> <li>- Approximation and rounding numbers within 9 digits.</li> <li>- Numbers Square and cubic, Square and Cubic root for numbers of perfect square and Cubic.</li> <li>- Common multiple and divisor, prime numbers, and factorizing numbers .</li> <li>- The least common multiple and the greatest common divisor for two or three numbers within three digits.</li> <li>- concept of fraction, equivalent, reducing, comparing</li> <li>- facts of addition and subtraction on fractions.</li> <li>- multiplying and dividing fraction with integer.</li> <li>- Decimal, and common fractions Addition and subtraction.</li> <li>- Decimal and common fractions multiplication and division.</li> <li>- Converting decimal fractions to common fraction.</li> <li>- Approximation and Turning decimal fractions to one or two place value.</li> <li>- Ratio, .Percentage, and Proportion .</li> <li>- Simple profit, and lost.</li> <li>- Taxes and almsgiving.</li> <li>- Application problems on the basic operations on numbers and ratio, and fractions.</li> </ul>

<b>Algebra</b>	-----	-----	<ul style="list-style-type: none"> <li>- Using symbols.</li> <li>- Simple expressions and substitution.</li> <li>- Solving equation with one variable includes one of the basic operations.</li> <li>- Application problems by using symbols on the basic operations.</li> <li>- Open sentences containing the four operations on fractions.</li> </ul>
<b>Geometry</b>	<ul style="list-style-type: none"> <li>- Revision of drawing a triangle with given properties.</li> <li>- Drawing circles and calculating their circumferences and areas,</li> <li>- drawing quadrangles.</li> <li>- The map scale, finding out the actual distance between two points on a map.</li> </ul>	<ul style="list-style-type: none"> <li>- Concepts of: square, rectangle and parallelogram, triangle, trapezoid, right cylinder, cube, circle area, The volume and units.</li> <li>- Using the relations to find the area and volume of figures</li> <li>- Areas of square, rectangle and parallelogram.</li> <li>- Areas of triangle, trapezoid and rhombus.</li> <li>- Circle circumference, and area of circle.</li> <li>- Regular polygons (triangle, square, hexagon, octagon),</li> <li>- surface and total surface areas of cube and rectangular solid.</li> <li>- Volumes of cube and rectangular solid.</li> <li>- Volumes and total surface areas of right cylinder.</li> </ul>	<ul style="list-style-type: none"> <li>- Angle: measuring and types.</li> <li>- Sum of triangle angles, and sum of angles measures around point</li> <li>- Draw triangle if two angles and side given, and if given angle lies between two sides.</li> <li>- Lines : parallel, perpendicular, and intersection.</li> <li>- Drawing parallel and perpendicular lines.</li> <li>- the relations between angles measurements : neighboring, Corresponding and vertically opposite in the parallelism case</li> <li>- Drawing the square , rectangle.</li> <li>- Systematic ,non systematic shapes and hexagons.</li> <li>- the circle: center , diameter , arc and cord .</li> <li>- The quadruple shapes s and summation of angles.</li> <li>- Properties of quadruple related to sides , angles, and diameters.</li> <li>- Drawing triangle if given three sides.</li> <li>- Drawing parallelogram if given angle lies between two neighbor sides.</li> <li>- Drawing parallelogram if given two neighbor sides one diameter.</li> <li>- Circle and surroundings.</li> <li>- Drawing regular shapes inside circle as square, rectangular.</li> </ul>
<b>Measurement</b>	-----	<ul style="list-style-type: none"> <li>- Length units: Meter ( multiples and part ).</li> <li>- Area units: square meter ( multiples and part ).</li> </ul>	<ul style="list-style-type: none"> <li>- Reviewing the metric units of length</li> <li>- Metric units for areas.</li> </ul>

		<ul style="list-style-type: none"> <li>- Volume units: Cubic meter: multiples and parts of cubic meter.</li> <li>- Relations between units and parts and multiples</li> <li>- Using units of measurements in solving problem on area and volume and length.</li> </ul>	<ul style="list-style-type: none"> <li>- Metric units for volume.</li> <li>- Liter and Mel liter to measuring the capacity.</li> <li>- Mass units ( ton as a unit).</li> <li>- Temperature units.</li> <li>- Adding and subtraction measurement units.</li> <li>- Areas of: triangle, parallelogram, and Rhombus.</li> <li>- Total area of cubic and rectangular solid.</li> <li>- The pyramid and the prism</li> <li>- Cubic volume and prism.</li> <li>- Application problems involving rates and derived measurements.</li> </ul>
<b>Data Analysis and Probability</b>	<ul style="list-style-type: none"> <li>- Concept of Arithmetic average, and finding for a set of numbers.</li> <li>- Interpreting and Representing data by diagrams: bar graphs and charts.</li> </ul>	<ul style="list-style-type: none"> <li>- Computing the average for a set of values.</li> </ul>	<ul style="list-style-type: none"> <li>- Representing the qualitative data by tables ,pictures, and lines.</li> <li>- representing qualitative data using frequency tables</li> <li>- calculating the mean and range to a set of numbers.</li> <li>- Application problem.</li> </ul>

The mathematical content Analysis of mathematics curriculum for the **seventh grade** in light of the standards of content among the sub-periods of development.

<b>Standards / Periods</b>	<b>The first period (1964 – 1972 )</b>	<b>The second period (1972 – 1987 )</b>	<b>The third period (1987 – 1999 )</b>
<b>Number and Operations</b>	<ul style="list-style-type: none"> <li>- Revision: divisibility factorization, power, finding out the square roots of numbers by means of factorization,</li> <li>- the concepts of the greatest common divisor and the least common multiple,</li> <li>- finding out the greatest common divisor and the least common multiple by means of factorization.</li> <li>- Common fractions; operations on common fractions.</li> <li>- Decimal fractions and approximation: arithmetic operations on decimal fractions.</li> <li>- converting fractions and representing them</li> </ul>	<ul style="list-style-type: none"> <li>- Concepts of: integer number, commutative, closed and association, open set, equation, solution set, substitution set, inequality, negative number, integers set , unique element.</li> <li>- Generalizations related to the relation between integers numbers.</li> <li>- Basic operation on integers numbers and their properties</li> <li>- Concepts of: fraction, equivalent fractions, rational number, periodic decimal fraction, finite and infinite decimal fractions, and set of rational numbers.</li> <li>- operations and their properties on set of rational</li> </ul>	<ul style="list-style-type: none"> <li>- Concepts of Integer numbers( positive and negative), Exponents, Absolute value of negative numbers, and Integer numbers comparing.</li> <li>- Facts of addition, subtraction, multiplication and division on Integer numbers.</li> <li>- concept of Rational number and inverse and comparing.</li> <li>- Facts of addition, subtraction, multiplication and division on Rational numbers.</li> <li>- Numbers factorizing, and Square root .</li> <li>- Common factors : least multiple and greatest divisor.</li> </ul>

	<p>in different forms.</p> <ul style="list-style-type: none"> <li>- Approximating numbers, solving different problems concerning the four basic operations of arithmetic.</li> </ul>	<p>numbers.</p> <ul style="list-style-type: none"> <li>- Write the rational numbers in simple form</li> <li>- Convert the infinite periodic decimal fractions to finite fraction</li> <li>- Convert the rational numbers to decimal fractions</li> </ul>	<ul style="list-style-type: none"> <li>- Concept of proportion, Direct and inverse proportion.</li> <li>- Laws of proportion.</li> <li>- Real life Applications on proportion.</li> </ul>
<b>Algebra</b>	<ul style="list-style-type: none"> <li>- Symbols and algebraic terms, factors of algebraic terms, calculating the numerical value of an algebraic expression.</li> <li>- The four fundamental operations of arithmetic on algebraic expressions,</li> <li>- reducing common algebraic fractions.</li> <li>- Simple algebraic equations and how to solve them.</li> </ul>	<ul style="list-style-type: none"> <li>- Concept and symbol of Set, elements of set, union and intersection, empty set, subset, distinct sets,</li> <li>- concept of equal two sets, and symbols related to these concepts,</li> <li>- Venn diagrams,</li> <li>- Concept of : algebraic term, algebraic expressions, factors analysis, common factors, numbers power, set of odd and even numbers</li> <li>- Using symbols to write algebraic expressions,</li> <li>- factorizing algebraic expressions by means of common factors or collecting terms,</li> <li>- addition and subtraction of algebraic terms,</li> <li>- factorizing algebraic expressions as product of prime factors,</li> <li>- expressing by means of exponent,</li> <li>- using distribution law in algebraic expressions.</li> <li>- algebraic expressions cancellation</li> <li>- Concept and symbols of: Open sentences, cancellation rules .</li> <li>- Solve simple Equations of the 1st degree.</li> <li>- Solve simple inequalities of the 1st degree</li> <li>- Using properties of inequalities in solving</li> <li>- Solve real life problems on inequalities and Equations</li> </ul>	<ul style="list-style-type: none"> <li>- Set and elements, Sub-set and equal sets.</li> <li>- Union , intersection and subtraction of sets.</li> <li>- The whole set and complementary.</li> <li>- Properties of operations on sets.</li> <li>- De Morgan laws.</li> <li>- Algebraic expression and terms.</li> <li>- Finding the value of algebraic expression by substitution.</li> <li>- Algebraic expression addition and subtraction.</li> <li>- Simple algebraic expression multiplication.</li> <li>- Factorizing algebraic expressions by common factor.</li> <li>- Open statement, set of substitution, and solution set.</li> <li>- Solving linear equation with one variable.</li> <li>- Application problems includes temperature degree.</li> </ul>
<b>Geometry</b>	<ul style="list-style-type: none"> <li>- Angles: recognizing the types of angles and the relationships between them.</li> <li>- Parallel lines and the relationships between the resultant angles.</li> <li>- Geometric theories concerning the angles of</li> </ul>	<ul style="list-style-type: none"> <li>- Concepts and symbols of: Angles, types of angles. Line, ray, segment, parallel and perpendicular lines.</li> <li>- Relations related to lines and angles.</li> <li>- Summation of triangle angles.</li> </ul>	<ul style="list-style-type: none"> <li>- Parallel and intersection lines, and relation between angles measures.</li> <li>- Summation of angles measures of closed polygon .</li> <li>- Cases of triangles Congruency.</li> </ul>

	<p>the triangle and polygon.</p> <ul style="list-style-type: none"> <li>- Proving theories using congruent triangles.</li> <li>- constructional geometry: using geometry tools to transfer a given angle,</li> <li>- to draw line parallel to a given a line,</li> <li>- bisect a given angle and draw a line perpendicular to a given line from a point on the line or from a point outside the line, how to use the proof.</li> </ul>	<ul style="list-style-type: none"> <li>- Drawing parallel lines using the ruler and triangle.</li> <li>- Concept of : curve, closed curve, simple closed curve, concave, area, symmetry shapes, units of area, parallelogram and other geometrical figures.</li> <li>- Drawing the geometrical figures</li> <li>- Properties the concept of area, areas of rectangle, triangle, parallelogram,</li> <li>- using the general relation of geometric figures to determined the areas.</li> <li>- Concept of Pythagoras theorem,</li> <li>- Solving problems by using Pythagoras theorem</li> <li>- Concept of : solid, properties of solids, volume and surface areas of solids,</li> <li>- Using Properties relations to explain the figures of solids, cube, rectangular solid, right pyramid, right prism</li> <li>- Solving problems by using laws of volume for figures</li> <li>- Solving real life problems on volumes of figures.</li> </ul>	<ul style="list-style-type: none"> <li>- Cases of triangles similarity</li> <li>- Transfer of known angle.</li> <li>- Bisection given angle.</li> <li>- Constructing perpendicular line from point lies on line.</li> <li>- Constructing perpendicular line from a given point not lies on line.</li> <li>- Bisection segment.</li> </ul>
<b>Measurement</b>	<ul style="list-style-type: none"> <li>- apply and use geometric tools to draw parallel lines, transfer and bisect angles to accurately.</li> <li>- Draw vertical line from a point outside and lies on a given line with accuracy.</li> </ul>	<ul style="list-style-type: none"> <li>- Drawing parallel lines using the ruler and triangle with level of precision</li> <li>- Using Properties relations to explain, and determined the volume of figures: solids, cube, rectangular solid, right pyramid, right prism.</li> <li>- using the general relation of geometric figures to determined the areas.</li> </ul>	<ul style="list-style-type: none"> <li>- Areas of irregular shapes.</li> <li>- Sector area</li> <li>- Surface area and volume of the pyramid</li> <li>- Surface area and volume of the prism.</li> <li>- Volumes of irregular solids.</li> </ul>
<b>Data Analysis and Probability</b>			<ul style="list-style-type: none"> <li>- Data representation by sectors and frequency tables.</li> <li>- The mean for data grouped in frequency tables.</li> <li>- Random experiment (sample space)</li> </ul>

The mathematical content Analysis of mathematics curriculum for the **Eighth grade** in light of the standards of content among the sub-periods of development.

Standards / Periods	The first period (1964 – 1972 )	The second period (1972 – 1987 )	The third period (1987 – 1999 )
<b>Number and Operations</b>	<ul style="list-style-type: none"> <li>- Finding out the square roots of numbers.</li> </ul>	<ul style="list-style-type: none"> <li>- Concept of ratio, percentage, proportion: directly and inversely proportional quantities, proportional division, gain and loss, simple and compound interest, bills discount, insurance.</li> <li>- Concept of Real number, rational and irrational numbers,</li> <li>- Square root of number, numbers powers, Integer and rational exponents</li> <li>- Representing Intervals and kinds of intervals on line number.</li> <li>- decimal and approximated representation.</li> <li>- Operations, properties of operations, on real numbers.</li> <li>- Rules of integer and rational exponents on sets of numbers.</li> <li>- calculating roots of numbers.</li> <li>- Properties of binary operations: closure, commutatively, associativity, identity element,</li> <li>- inverse, distribution of multiplication over addition on the sets of integers and rational.</li> <li>- Properties of addition and multiplication of real numbers,</li> <li>- distribution of multiplication over addition.</li> </ul>	<ul style="list-style-type: none"> <li>- Numbers : rational , irrational and real.</li> <li>- Calculating the Square root of numbers using the general way.</li> <li>- The four basic operations on real numbers.</li> <li>- Properties of addition and multiplication on real numbers.</li> <li>- Laws of Exponents and roots.</li> <li>- Insurance Calculating, legacy Calculating ( as application on proportion and ratio).</li> <li>- Calculating commercial Discounts, Simple and compound profit, and Stocks market and bonds.</li> </ul>
<b>Algebra</b>	<ul style="list-style-type: none"> <li>- Solving a system of linear equation.</li> <li>- Using different ways of factorization to reduce algebraic expression.</li> <li>- The four fundamental operations of arithmetic on algebraic expressions.</li> <li>- algebraic fractions: arithmetic operations on algebraic fractions.</li> <li>- Reducing algebraic fractions and solving algebraic fractional equations.</li> </ul>	<ul style="list-style-type: none"> <li>- Sets: whole set, complement of a set, isolating sets,</li> <li>- properties of union and intersection on sets.</li> <li>- De Morgan laws.</li> <li>- concept of relation, domain, range and image</li> <li>- relations expressions and graphing relations.</li> <li>- the concept of function, domain, range and image equal functions.</li> </ul>	<ul style="list-style-type: none"> <li>- Multiplication of two expressions.</li> <li>- factorizing difference between two quadratic expressions.</li> <li>- factorizing quadratic expression.</li> <li>- Relations with finite domain and representation.</li> <li>- Function and representation</li> <li>- Linear function and graphing.</li> <li>- linear equation with two variables and</li> </ul>

	<ul style="list-style-type: none"> <li>- Representing points in the Cartesian plane.</li> </ul>	<ul style="list-style-type: none"> <li>- The expressions and properties of relation and function</li> <li>- Using expressions of function and graphing functions</li> <li>- Using the rules of exponents to simplify the algebraic expressions.</li> <li>- multiplication of algebraic expression.</li> <li>- algebraic expression analysis: difference of two squares, sum and difference of two cubic terms,</li> <li>- factorizing of three-term expressions,</li> <li>- Solving real life problems on algebraic operations.</li> <li>- Concept of Systems of linear inequalities</li> <li>- linear equation with two variables,</li> <li>- solving a system of two linear equations by substitution and elimination.</li> <li>- Proving theorems of quadrilaterals by means of congruent triangles.</li> <li>- Solving real life problems on Systems of linear equations.</li> </ul>	<ul style="list-style-type: none"> <li>graphing.</li> <li>- Solve linear equation with two variables by using : graphing, omitting way or substitution way.</li> <li>- Basic trigonometric ratios: sine , cosine , tangent</li> <li>- of right triangular</li> <li>- Calculating trigonometric ratios by using tables.</li> <li>- Calculating angle if the trigonometric ratios are known</li> <li>- Applications on Solving right triangle.</li> </ul>
<b>Geometry</b>	<ul style="list-style-type: none"> <li>- The concept of Pythagoras theorem.</li> <li>- Using Pythagoras theorem to find the solution of a right-angle triangle.</li> <li>- Proving geometric theories concerning the properties of isosceles triangle.</li> <li>- Properties of parallelogram.</li> <li>- The relationships between angles and sides of the triangle.</li> <li>- Using theories to solve and prove geometric problems.</li> </ul>	<ul style="list-style-type: none"> <li>- Concept of Triangle: angles and sides of triangles</li> <li>- the relationships between angles and sides of triangles,</li> <li>- congruent and similar triangles,</li> <li>- solving geometrical problems using the congruent and similar triangles</li> <li>- intersected lines inside the triangle,</li> <li>- properties of isosceles triangle, equilateral triangle, right angle triangle,</li> <li>- concept and properties of quadrilateral, trapezoid, parallelogram, and similar figures.</li> <li>- Theorems and proof on the relations of geometrical figures using the congruent of triangles.</li> </ul>	<ul style="list-style-type: none"> <li>- Properties of triangle types.</li> <li>- Properties of right triangle and Pythagoras theorem.</li> <li>- The relation between the triangle sides and angle</li> <li>- the exterior angle related to the triangle.</li> <li>- The segment joint the vertex and chord intermediate in the right triangle.</li> <li>- Cartesian multiplication for a finite set</li> <li>- Cartesian coordinates.</li> <li>- Properties of quadrilateral shapes: Parallelogram, rectangle and square.</li> <li>- Triangles Equivalence.</li> <li>- Parallelogram Equivalence.</li> <li>- Surface Area and volume of cone</li> <li>- Volume and surface area of cylinder.</li> </ul>

			- Surface area and volume of the sphere.
<b>Measurement</b>	<ul style="list-style-type: none"> <li>- Using geometry tools to draw geometric figures.</li> <li>- Systems of measurement: Metric system and British system of measurement:</li> <li>- revision of measurement units,</li> <li>- converting between the different units of length, area, volume, amplitude and weight.</li> <li>- Using units of measurement to solve mathematical and practical problems of volumes and areas.</li> </ul>	<ul style="list-style-type: none"> <li>- geometric constructions using ruler and compasses,</li> <li>- Drawing the geometrical figures in light of their properties.</li> </ul>	<ul style="list-style-type: none"> <li>- Use formulas to determined the surface area and volume of cone, cylinder and sphere.</li> </ul>
<b>Data Analysis and Probability</b>	-----	-----	<ul style="list-style-type: none"> <li>- The Stability Phenomena of frequency ratio</li> <li>- Sample space.</li> <li>- Types of events.</li> <li>- Using principle counting.</li> <li>- Proprieties of probability.</li> </ul>

The mathematical content Analysis of mathematics curriculum for the **Ninth grade** in light of the standards of content among the sub-periods of development.

<b>Standards / Periods</b>	<b>The first period (1964 – 1972 )</b>	<b>The second period (1972 – 1987 )</b>	<b>The third period (1987 – 1999 )</b>
<b>Number and Operations</b>	<ul style="list-style-type: none"> <li>- Proportion: percentage, using percentage to solve problems,</li> <li>- proportional division, the gain and loss, simple interest, discount, compound interest.</li> </ul>	<ul style="list-style-type: none"> <li>- Concept of order relation on the set of real numbers,</li> <li>- the property of order relation on real numbers.</li> <li>- Using the property of order relation in solving mathematical problems</li> <li>- Properties of addition and multiplication of real numbers,</li> <li>- distribution of multiplication over addition</li> <li>- Properties of operations on real numbers set.</li> </ul>	<ul style="list-style-type: none"> <li>- Exponentials and applications on small and large numbers.</li> </ul>
<b>Algebra</b>	<ul style="list-style-type: none"> <li>- Factorization of algebraic expressions.</li> <li>- Factorizing the algebraic expression on the general form : <math>aX^2 + bX + c</math>.</li> <li>- Factorizing the difference between squares of two algebraic expressions.</li> <li>- Factorizing summation and difference cubic</li> </ul>	<ul style="list-style-type: none"> <li>- Concept of linear statement, prime algebraic statement, similar terms,</li> <li>- Expressions of Algebraic fraction, concept and simplifying</li> <li>- Factorizing three-term algebraic expressions, by using different methods of analysis</li> </ul>	<ul style="list-style-type: none"> <li>- Reviewing factorizing of quadratic expressions and difference between two squares expressions.</li> <li>- Analyzing expressions by square Completing.</li> <li>- Analyzing the summation of tow cubic expressions , and the difference between tow</li> </ul>



	<p>of two algebraic expressions.</p> <ul style="list-style-type: none"> <li>- Calculating the square root by means of factorization.</li> <li>- Reducing algebraic expression by means of factorization.</li> <li>- Solving practical problems by means of factorization.</li> <li>- Solving linear algebraic equations (degree one) and quadratic algebraic equations (degree two) by means of factorization.</li> <li>- sketching: providing sketches of linear functions.</li> <li>- Solving a system of linear equations by means of sketching.</li> </ul>	<ul style="list-style-type: none"> <li>- the greatest common divisor, and multiple common least of expressions</li> <li>- reduction of algebraic fractions using the greatest common divisor, and least common multiple,</li> <li>- addition and subtraction of algebraic fractions</li> <li>- multiplication and division of algebraic fractions.</li> <li>- Concept of Linear function, Quadratic equations , quadratic function, maximum and minimum values for function</li> <li>- Quadratic equations: solving quadratic equations using the discriminator</li> <li>- Roots of quadratic functions and graphing quadratic</li> <li>- Roots of linear function and graphing linear function,</li> <li>- Properties of Linear and quadratic function</li> <li>- The relation between the roots of equation and zeros of functions</li> <li>- Solving problems on functions</li> <li>- The relationships between the discriminator and the graphing of quadratic functions</li> <li>- Concept of Inequalities</li> <li>- linear inequality with two variables,</li> <li>- graphing linear inequalities with 2 variables.</li> <li>- Solving a system of linear inequalities by means of graphs.</li> <li>- Linear programming and related practical problems.</li> <li>- Quadratic equations: solving quadratic equations by means of: factorization, completing the square,</li> <li>- the quadratic formula and graphs.</li> <li>- Related application, discriminator of quadratic equations,</li> </ul>	<p>cubic expressions.</p> <ul style="list-style-type: none"> <li>- Reducing the Algebraic fractions.</li> <li>- The greatest common factor , and the least common multiple of algebraic expressions.</li> <li>- The four basic operations on expressions.</li> <li>- the Linear inequality of one variable</li> <li>- the Linear inequality of tow variables and their graphical presentation.</li> <li>- Solving system of linear inequality with tow variables graphing.</li> <li>- Applications problems on linear inequality with tow variables.</li> <li>- Linear and quadratic functions.</li> <li>- Solving the quadratic equation by: analysis factors, general law, and graphing.</li> <li>- Solving fractions equations, and application problems.</li> <li>- Solving Simple Trigonometric equations.</li> </ul>
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		- the relationship between discriminator and roots of quadratic equations.	
<b>Geometry</b>	<ul style="list-style-type: none"> <li>- The concept of geometrical transference, identifying transferring shapes.</li> <li>- Geometric theories concerning congruence and areas.</li> <li>- Using geometric facts to solve problems.</li> <li>- Pythagoras Theorem: using Pythagoras theorem to find out the solution of the right-angle triangle.</li> <li>- The concept of trigonometric expressions and calculating them.</li> <li>- Using mathematical formulas to calculate areas of geometric figures (two dimensions).</li> <li>- Proving geometric theories.</li> <li>- The concept of the circle and related theories, proving them using these theories to solve problems of geometry.</li> </ul>	<p>Analytic geometry: rectangular coordinates, original coordinate, mid-point</p> <ul style="list-style-type: none"> <li>- Concept and law of the distance between two points of line segment.</li> <li>- Straight line: slope, forms of equation</li> <li>- Founding the lines equation in light of conditions</li> <li>- Conditions of Parallel and perpendicular lines using the concept of slope</li> <li>- Proof the theorems and some of the geometrical relations</li> </ul> <p>Circle: center, radius, diameter, chords and arcs of circle,</p> <ul style="list-style-type: none"> <li>- sector, circular segment,</li> <li>- angles and lines related to the circle.</li> <li>- the relationships between lines and angles related to circle</li> <li>- concept of circular quadrilaterals, solids: prism, pyramid, cylinder, cone and sphere, volumes and surface areas of solids</li> <li>- use the geometrical relation to find the areas and volume of solids.</li> <li>- Solve geometrical problems</li> <li>- Proof theorems related to the topics</li> </ul> <p>Trigonometric</p> <ul style="list-style-type: none"> <li>- Concept and symbols of trigonometric ratio, sine, cosine, and tan</li> <li>- using right triangle to illustrate the relationships between trigonometric ratios.</li> <li>- Founding the sine, cosine and tan of angles 30, 60 and 45</li> <li>- The relation between the trigonometric ratio</li> <li>- calculating the values of trigonometric expressions</li> </ul>	<ul style="list-style-type: none"> <li>- The orthogonal coordinates in plane.</li> <li>- The distance between two points.</li> <li>- coordinates of a point that bisecting a straight line</li> <li>- straight line: slope, equation, and parallel condition.</li> <li>- Geometric transformation :reflections ,symmetry, rotation, and dilatation .</li> <li>- 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.</li> <li>- Theorems of circle chords.</li> <li>- Circles intersection.</li> <li>- Circle tangents and their theorems.</li> <li>- The circular Quadrilateral shapes and properties.</li> <li>- Drawing triangle in side a circle.</li> <li>- Drawing circle inside a triangle.</li> <li>- Trigonometric ratios.</li> <li>- The relations between the basic trigonometric ratios.</li> <li>- The Trigonometric ratios of the angle 30,45, 60.</li> <li>- Calculating trigonometric ratios for acute angle if one known.</li> <li>- Using tables of trigonometric ratios.</li> <li>- Solving the right triangle.</li> </ul>

		<ul style="list-style-type: none"> <li>- using tables of trigonometric ratio</li> <li>- solving the trigonometric equation using the generalization of trigonometric ratio</li> <li>- proof the trigonometric Identities</li> <li>- solving real life problems on the trigonometric ratios.</li> </ul>	
<b>Measurement</b>	- Solving mathematical and practical problems using units of units of money.	-----	-----
<b>Data Analysis and Probability</b>	-----	<ul style="list-style-type: none"> <li>- Concept of Collecting and organizing data, representing data: pie chart, bar graph, histogram, and frequency polygon.</li> <li>- Reading the statistics tables and interpretation the data</li> <li>- Calculating the average of data Mean,</li> <li>- Concept of mode, and founding for data, and frequency tables</li> <li>- Concept and symbols of sample space, mutually exclusive events, simple events,</li> <li>- probability,</li> <li>- writing the sample space for a random experimental random</li> <li>- uniform probability ,and laws of uniform probability,</li> <li>- intersection and founding probability of the intersection of two events,</li> <li>- probability of complementary event.</li> <li>- Using laws probability in solving problems.</li> </ul>	<ul style="list-style-type: none"> <li>- Representing statistical data by: frequency tables, histogram and frequency polygon.</li> <li>- Tendency measurements ,The mean, median and mode.</li> <li>- Calculating the measures of center for values given, and for frequency tables.</li> <li>- The shape of frequency distribution.</li> </ul>

The mathematical content Analysis of mathematics curriculum for the **Tenth grade** in light of the standards of content among the sub-periods of development.

<b>Standards / Periods</b>	<b>The first period (1964 – 1972 )</b>	<b>The second period (1972 – 1987 )</b>	<b>The third period (1987 – 1999 )</b>
<b>Number and Operations</b>	<ul style="list-style-type: none"> <li>- Proportion: definitions of ratio, terms of the ratio.</li> <li>- proportionality Rules.</li> <li>- The ratio between areas of two triangles have the same high as the ratio between their bases.</li> </ul>	<ul style="list-style-type: none"> <li>- Concept of Binary operation on sets of numbers,</li> <li>- Properties of Binary operation( closed, commutative, associative, unique element, inverse of element)</li> </ul>	-----

	<ul style="list-style-type: none"> <li>- Numerical application on ratio and proportional. proportional division:</li> <li>- Definitions and theorems and numerical applications</li> <li>- Properties of multiplication distribution on addition operation on Natural and Rational numbers.</li> </ul>	<ul style="list-style-type: none"> <li>- Concept and properties of Mathematical system with one operation</li> <li>- Concept and properties of Mathematical system with two operations</li> <li>- Concept and properties of field , order field and group</li> <li>- Theorems and Proofs related to these concepts mathematical systems.</li> <li>- Concept and properties of integers numbers.</li> <li>- Numerical systems: binary, octal</li> <li>- Writing numbers in binary and octal systems</li> <li>- Component of computer: input, output, arithmetic unit, control unit, central process.</li> <li>- Converting numbers from decimal to binary and octal</li> <li>- Converting numbers from binary to octal and inversely</li> <li>- Facts of basic operations on binary and octal systems</li> <li>- Subtraction operation by using the number complement in binary system.</li> <li>- Explain the steps of solving problems by drawing flowcharts.</li> </ul>	
<b>Algebra</b>	<ul style="list-style-type: none"> <li>- Sets theory: concept of set, and sets symbol. elements of a set</li> <li>- representation by Venn Diagrams</li> <li>- universal set</li> <li>- subsets and operations on sets and their symbols.</li> <li>- De Morgan laws</li> <li>- Function:</li> <li>- linear functions and quadratic functions, graphing linear and quadratic functions.</li> <li>- Linear and quadratic equations and inequalities, solving quadratic equations using the algebraic methods.</li> </ul>	<ul style="list-style-type: none"> <li>- Concept of relation and founding the Domain, range, image,</li> <li>- Properties of relations reflection, symmetric, transitive and equivalence relation,</li> <li>- Using the Properties of relations in solving problems</li> <li>- found the equivalence classes of a given set .</li> <li>- Functions, types and properties</li> <li>- Concept and Founding composition of two function</li> <li>- inverse and identity function</li> <li>- equality of two pairs coordinate.</li> <li>- tangent equation of circle at given point.</li> </ul>	<ul style="list-style-type: none"> <li>- Polynomial definition.</li> <li>- Division operation on Polynomials.</li> <li>- The synthetic division method.</li> <li>- Remainder theorem and Polynomials zeros.</li> <li>- Relations and types.</li> <li>- Functions and types.</li> <li>- The four basic operations on functions.</li> <li>- Composition of functions.</li> <li>- Solving equation with one variable.</li> <li>- Solving a system of three linear equations.</li> <li>- Solving a system of equations :one is linear and the other quadratic.</li> <li>- Solving a system of quadratic equations</li> </ul>

		<ul style="list-style-type: none"> <li>- equivalence statements, open statement,</li> <li>- set of substitution ,set of solution, solution of open statements,</li> </ul>	whenas the solution end to linear equations.
<b>Geometry</b>	<ul style="list-style-type: none"> <li>- circle Angles: definitions,</li> <li>- theorems: the relation between the central angle and the angle lies on the circle on the same arc.</li> <li>- The angle in front of the diameter</li> <li>- the relation between angles lies on the circle and have the same arc.</li> <li>- Numerical application on circle angles.</li> <li>- Definitions of biggest and smallest arc</li> <li>- Theorem and results of theorem</li> <li>- Numerical application on arcs of the circles</li> <li>- tangents of the circle: definitions of tangent and tangent point.</li> <li>- Theorem and results of theorem</li> <li>- Numerical application on circle tangents .</li> <li>- circles tangency: definitions of circles tangency from internal and from outside, and tangent point.</li> <li>- Theorem and results of theorem</li> <li>- Numerical application on circle tangency</li> <li>- Tangency angles: definitions of angle tangent, sector.</li> <li>- Theorem and results of theorem</li> <li>- Numerical application on circle tangency</li> </ul> <p>laws of circle:</p> <ul style="list-style-type: none"> <li>- area, and perimeter of circle</li> <li>- Numerical application on circle laws.</li> <li>- Similarity:: Similarity of shapes</li> <li>- Similarity of triangles</li> <li>- Numerical applications</li> </ul> <p>squares of sides, the triangle:</p> <ul style="list-style-type: none"> <li>- projection of lines on other line</li> <li>- numerical applications on squares of, triangle</li> </ul>	<ul style="list-style-type: none"> <li>- Concept of: statement, truth value of statement,</li> <li>- negative of statement, conditional statements and compound statements</li> <li>- symbols of connection (and, or, and implies, if and only if) ,</li> <li>- truth tables of related connections (or , and , conditional connections)</li> <li>- using direct and indirect proof to prove the validity of conditional statements</li> <li>- using the truth tables to prove the equivalence of statements.</li> <li>- Concept and found the Cartesian coordinates of two sets,</li> <li>- Concept on angle, and angle in the standard setting, positive and negative angle</li> <li>- Concepts of Periodic functions :sin (z), cos(x), tan(x), sec(x), cot(z), and cosec(x).</li> <li>- Concept of straight line, slope, slope angle and equation</li> <li>- cases of founding the equation of straight line</li> <li>- the relation between parallel and perpendicular two lines</li> <li>- calculating the distance between point and known line</li> <li>- concept of circle unit, radius, and center</li> <li>- the circle equation if the center and radius known</li> <li>- founding the center and radius from a given equation</li> <li>- Use the relations between the Periodic functions to calculate the values of functions.</li> <li>- Properties of the Periodic functions : capacity, periodic</li> </ul>	<ul style="list-style-type: none"> <li>- The Cartesian products.</li> <li>- Angles measuring (radian, and gradient ).</li> <li>- Periodic functions.</li> <li>- Sine and cosine graphical representing (capacity and period).</li> <li>- The circular arc length.</li> <li>- The forms of straight line equation.</li> <li>- The perpendicular lines.</li> <li>- The distance between point and line.</li> <li>- Circle equation.</li> <li>- Geometric transformation.</li> <li>- Trigonometry ratios of compound angles.</li> <li>- Trigonometry ratios of multiple and half angles.</li> <li>- The area of triangle, sector and circular segment.</li> <li>- Trigonometric equations.</li> <li>- Trigonometric Identities.</li> <li>- Planes and Lines.</li> <li>- Parallel and perpendicular lines.</li> <li>- Parallel and perpendicular planes.</li> <li>- The angle of intersection of two planes.</li> <li>- The orthogonal projection</li> <li>- The skew lines.</li> </ul>

	<p>sides.</p> <ul style="list-style-type: none"> <li>- Solving general exercises.</li> <li>- Trigonometry expressions of acute angles: definitions and calculation of <math>\tan(x)</math>, <math>\cos(x)</math>, <math>\sec(x)</math>, <math>\operatorname{cosec}(x)</math>, <math>\cot(x)</math></li> <li>- Trigonometry expressions for angles (30, 45, 60).</li> <li>- Solving real life problems.</li> <li>- fundamental relationships among them.</li> <li>- Trigonometry identities and equations</li> </ul>	<ul style="list-style-type: none"> <li>- Converting between angles from grad to radius measurement</li> <li>- Concept of Compound angle ,</li> <li>- founding the sine and cosine and tangent of addition and subtraction of two angles.</li> <li>- calculating the trigonometric ratios of Compound angles.</li> <li>- Concept and solving trigonometric identical</li> <li>- Solving trigonometric equation</li> <li>- using the tables of trigonometric ratios to find the values of periodic function and angles.</li> <li>- Graphing the sine , cosine and tangent functions</li> <li>- Founding the values of periodic functions for angles: 0, 30, 300, 60, and 90 without using the tables of ratios.</li> <li>- Concept of geometrical transference, shifting, rotating, reflection</li> <li>- The formulas of the geometrical transference, shifting, rotating, reflection</li> <li>- The Properties of standards transference(shifting, rotating, reflection).</li> <li>- The Shifting formula: <math>S : (x, y) \rightarrow (x + a, y + b)</math></li> <li>- The Rotating formula: <math>R : (x, y) \rightarrow (x \cos(\theta) - y \sin(\theta), x \sin(\theta) + y \cos(\theta))</math>, with angle <math>\theta</math>, and with opposite of the o'clock direction.</li> <li>- The Reflection formula in X axis: <math>F_x : (x, y) \rightarrow (x, -y)</math></li> <li>- The Reflection formula in Y axis: <math>F_y : (x, y) \rightarrow (-x, y)</math></li> <li>- The Reflection formula in original point: <math>F_o : (x, y) \rightarrow (-x, -y)</math></li> <li>- reflection formula in the line <math>y = x</math>, <math>F_{(y=x)} : (x, y) \rightarrow (y, x)</math></li> <li>- Concept and properties of non standard transference(Dilation and Extension)</li> </ul>	
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		<ul style="list-style-type: none"> <li>- The formulas of the non geometrical transference:</li> <li>- The Dilation formulas: <math>D : (x, y) \rightarrow (mx, y)</math></li> <li>- The Extension formulas: <math>E : (x, y) \rightarrow (x, my)</math></li> <li>- Represent geometrical transference of the points using the coordinates.</li> <li>- Concept and formula of identity shifting: <math>S : (x, y) \rightarrow (x, y)</math></li> <li>- Calculating the geometrical transference, shifting, rotating, reflection of the points</li> <li>- Concept and properties of composite geometrical transference,</li> <li>- Concept of plane, space, line, parallel, perpendicular, even angle status of lines in plane, projection.</li> <li>- The condition of identifying a plane</li> <li>- The relations between known line and known plane</li> <li>- The relation between two Parallel lines in space</li> <li>- The relation between two perpendicular lines in space</li> <li>- The relation between two Parallel or perpendicular planes in space</li> <li>- The relations between planes in space</li> <li>- The perpendicular projection</li> <li>- Projection point on plane, and on line</li> <li>- Projection of line on other line.</li> </ul>	
<b>Measurement</b>	-----	-----	-----
<b>Data Analysis and Probability</b>	-----	-----	<ul style="list-style-type: none"> <li>- Data dispersion through frequency distribution curves.</li> <li>- Deviation measurements :the range and the standard deviation.</li> <li>- Effect of linear transformation on measurements of tendency and deviation.</li> </ul>

The mathematical content Analysis of mathematics curriculum for the **Eleventh grade** in light of the standards of content among the sub-periods of development.

Standards / Periods	The first period (1964 – 1972 )	The second period (1972 – 1987 )	The third period (1987 – 1999 )
<b>Number and Operations</b>	<ul style="list-style-type: none"> <li>- Number system:: Set of Natural numbers and integer, properties of addition and multiplication operations as a groups and ring natural</li> <li>- Rational numbers and properties of addition and multiplication operations as a group and ring and field</li> <li>- Set of Real number</li> <li>- Using the Mathematical induction to prove the summation of sequences and geometrical sequences.</li> <li>- Numerical systems to base other than ten, and simple mathematical operations.</li> </ul>	<ul style="list-style-type: none"> <li>- Concept of :complex number, component (real and imaginary) , basic operations, polar coordinate , scale of numbers, and roots of complex numbers.</li> <li>- Adding the complex numbers</li> <li>- Multiplication and division complex numbers</li> <li>- Multiply complex numbers with radical</li> <li>- Properties of complex numbers as a system.</li> <li>- Founding the scale and capacity of complex number</li> <li>- Concept and properties of the cubic root of one.</li> <li>- the concepts of number base, number exponent, logarithm base, normal logarithm, and exponential and logarithm functions</li> <li>- laws of operations on exponentials and logarithms with rational exponent.</li> <li>- founding the logarithms of numbers through the tables of algorithms</li> <li>- concept of : matrix, entry of matrix, order, matrix with one row and matrix with one column, square matrix</li> <li>- conditions of equal two matrix</li> <li>- matrices addition, and properties of addition operation</li> <li>- matrices multiplication, and properties of multiplication operation</li> <li>- concept and founding the determinate of square matrix</li> <li>- the properties of matrices as a group,</li> <li>- concept and founding of matrix inverse in addition and multiplication</li> <li>- Concept of :vector, equal vectors, operations on</li> </ul>	<ul style="list-style-type: none"> <li>- Index numbers.</li> <li>- Real numbers</li> <li>- Properties of Order relation.</li> <li>- Limited Intervals and unlimited and representation on line numbers.</li> <li>- absolute value and properties.</li> <li>- Exponential and logarithms</li> <li>- Logarithms laws.</li> <li>- Using logarithms tables to finding common logarithms.</li> <li>- Matrices and determinates</li> <li>- Matrix and determinate.</li> <li>- Basic Operations on matrices.</li> <li>- Unity and inverse of matrices.</li> <li>- Counting principles and binomial theory</li> <li>- Counting techniques.</li> <li>- Permutations</li> <li>- Combinations</li> <li>- Binomials theory</li> <li>- Sequences and series</li> <li>- sequence and series,</li> <li>- Arithmetic sequence and series.</li> <li>- Geometrical sequence and series.</li> <li>- unlimited geometrical series.</li> </ul>



		<p>vectors(addition, multiplication), zero and unit vectors, magnitude of vector, dot product and cross product of vectors, scalar vector, and equivalent of two vectors.</p> <ul style="list-style-type: none"> <li>- Properties of dot product of vectors.</li> <li>- Concept of : permutations and symbol , combinations and symbol, summation symbol ? , mathematical induction, numbers factorial, binomial, general term, ratio between two terms, largest term, and middle term.</li> <li>- Founding the numbers of permutations Using the theorems</li> <li>- Founding the numbers of combinations Using the theorems</li> <li>- the theorems Proof related to the summations</li> <li>- Concept of : sequence, general term, limited series, and unlimited</li> <li>- Arithmetic sequence and Arithmetic series</li> <li>- geometrical sequence and unlimited geometrical series</li> <li>- founding the summation of Arithmetic series</li> <li>- founding the summation of geometrical series.</li> <li>- concept and founding the arithmetic average, and geometrical average for numbers are formative a sequence.</li> <li>- concept of absolute value for number, and function</li> <li>- properties of the absolute value</li> <li>- concept of function limit (right and left), and founding the limit of functions</li> <li>- concept of continuity on interval , and identifying the continuous functions</li> <li>- using the theorems of limits to calculating the limit of a given functions</li> <li>- verifying the continuity of function at point.</li> </ul>	
<b>Algebra</b>	- Relations: type of relations (refle xive,	- Concept of group, symmetrical groups,	- Solving linear equations and inequalities on real

	<p>symmetric, transitive, equivalence).</p> <ul style="list-style-type: none"> <li>- -Graphing of relations with two pairs of coordinates.</li> <li>- Functions: the concepts of domain and range</li> <li>- polynomials and algebraic functions.</li> <li>- exponential functions, and logarithmic functions.</li> <li>- the forms of straight line equations</li> <li>- <math>y = ax + c</math></li> <li>- <math>y - y_1 = a(x - x_1)</math></li> <li>- <math>ax + by + c = 0</math></li> </ul>	<p>subgroup, cyclic group, isomorphism,</p> <ul style="list-style-type: none"> <li>- Properties of mathematical system: closed, associative, commutative, unique element, and inverse element.</li> <li>- Solving problems on groups.</li> <li>- drawing the graphs of logarithms and exponential functions</li> <li>- the relation between the logarithms and exponential functions</li> <li>- solving system of equation with two or three variables using the matrices.</li> <li>- Facts of operations on vectors</li> <li>- Finding the vector equation of line</li> <li>- Finding the general terms for solving <math>(x + a)^n</math>.</li> <li>- Finding the middle term in solving <math>(x + a)^n</math>.</li> <li>- Calculating the <math>p(n, r)</math>, and <math>\binom{n}{r}</math>.</li> <li>- finding the general term of Arithmetic sequence</li> <li>- limit of sequence, and properties.</li> <li>- Properties of sequence, base, limited, unlimited, higher and lower terms</li> <li>- Finding number of terms of finite and infinite geometrical series</li> <li>- the concepts of polynomial function, and finding the degree</li> <li>- condition of equal two polynomial functions</li> <li>- concept of rational function, and finding the domain and range</li> <li>- concept of addition and multiplication of polynomial functions, and finding the degree, domain and range</li> <li>- concept of prime and non prime functions</li> <li>- concept of division polynomial functions</li> <li>- concept of remainder theory, and use to analysis the polynomial function</li> </ul>	<p>number.</p> <ul style="list-style-type: none"> <li>- Exponential function.</li> <li>- Concept of logarithms</li> <li>- Logarithm function</li> <li>- Solving linear equations using determinates.</li> <li>- trigonometric laws of transfer multiplication to addition and subtraction.</li> <li>- trigonometric laws of transfer addition and subtraction to multiplication.</li> <li>- trigonometric identities</li> <li>- Solving trigonometry equations.</li> </ul>
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<b>Geometry</b>	<ul style="list-style-type: none"> <li>- Analytical Geometry: the Cartesian coordinates,</li> <li>- the distance between two points,</li> <li>- the concept of slope</li> <li>- the slope of a straight line,</li> <li>- condition of lines parallel</li> <li>- condition of lines perpendicular</li> <li>- lines intersection and Fundamental theorems on their</li> <li>- Solid Geometry: Fundamental theorems of studying solids.</li> </ul>	<ul style="list-style-type: none"> <li>- Vectors theorems and proof</li> <li>- Representing the vectors using the coordinates</li> <li>- Calculating the angle between two vectors</li> <li>- Identifying the angle which lies between the vector and X-axis</li> <li>- Identifying the angle which lies between two vectors</li> <li>- Representing the complex number using the polar coordinates</li> <li>- Converting the complex number to polar</li> </ul>	<ul style="list-style-type: none"> <li>- Vectors in space: cartesian coordinates in space.</li> <li>- Vectors</li> <li>- Dot product of vectors.</li> <li>- Cross product of vectors</li> <li>- Application on vector space</li> </ul>

	<ul style="list-style-type: none"> <li>- Definitions and general principles,; the plane, parallel, perpendicular, the relation between line and plane , also plane with plane</li> <li>- Fundamental Theorems related to the relation between line and plane in parallel, intersection and perpendicular cases.</li> <li>- Fundamental Theorems related to the relation between two planes.</li> <li>- Solids: definitions of prism and cylinder ,</li> <li>- Fundamental Theorems related to the prism and cylinder.</li> </ul> <p>Trigonometry ratio:</p> <ul style="list-style-type: none"> <li>- definition of positive and negative angle</li> <li>- Trigonometry ratio by Cartesian coordinates</li> <li>- Trigonometry ratio for angles (0 and 90 and multiples)</li> <li>- trigonometry expressions of any angle,</li> <li>- graphing the Trigonometry functions.</li> <li>- circular measure: concept of circular unit (radius angle),</li> <li>- exchanging from grade to radius measures.</li> <li>- Founding the circular arc, piece and sectors area.</li> <li>- Compound angles: trigonometry ratio for sum and difference angles</li> <li>- Trigonometry ratio for multiple angles</li> </ul> <p>Exchanging from sum and difference ratio to multiplication product.</p>	<p>coordinate</p> <ul style="list-style-type: none"> <li>- Verifying from properties of group</li> <li>- fundamental facts and theorems related to groups.</li> <li>- Proving mathematical statements using the mathematical induction.</li> <li>- prove theorem of limit of addition and subtraction functions,</li> <li>- prove theorem of limit of multiplication and division functions.</li> </ul>	
<b>Measurement</b>	<ul style="list-style-type: none"> <li>- Speed, velocity and acceleration</li> <li>- Compound motion (movement )</li> <li>- projectiles, force, and motion laws</li> <li>- circular motion: velocity circular and acceleration circular</li> </ul>	<ul style="list-style-type: none"> <li>- solving applications problems using the logarithms</li> <li>- Using series idea to transfer periodic decimals fractions to rational number</li> <li>- Physical application on derivative , and finding velocity and acceleration among a given relation of motion</li> </ul>	-----

<b>Data Analysis and Probability</b>	-----	-----	<ul style="list-style-type: none"> <li>- Samples and methods of selecting</li> <li>- Normal distribution</li> <li>- Correlation</li> <li>- Regressions</li> </ul>
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The mathematical content Analysis of mathematics curriculum for the **Twelfth grade** in light of the standards of content among the sub-periods of development.

<b>Standards / Periods</b>	<b>The first period (1964 – 1972 )</b>	<b>The second period (1972 – 1987 )</b>	<b>The third period (1987 – 1999 )</b>
<b>Number and Operation</b>	Introduction on : <ul style="list-style-type: none"> <li>- Permutations and combinations,</li> <li>- binomial theory with integers and natural exponential ,</li> <li>- Number system: include reviewing to the topics in the previous class.</li> <li>- complex numbers and De Moivre’s Theorem.</li> <li>- Properties of addition and multiplication operations on real number as a field.</li> </ul>	<ul style="list-style-type: none"> <li>- Reviewing to the concepts and skills of : calculating the rate of change of function, limit of function, right limit , left limit, continuity at point, and derivative.</li> <li>- Reviewing to the fundamental theorems of limits and continuity.</li> <li>- Founding the upper and lower summation of systematic partition.</li> <li>- Using the fundamental properties in calculating the integration values of a given functions.</li> </ul>	<ul style="list-style-type: none"> <li>- Complex numbers: Represent complex number by symbol and formula</li> <li>- operations on complex numbers.</li> <li>- square root of complex numbers</li> <li>- solving equation using complex number system.</li> </ul> limits and continuity <ul style="list-style-type: none"> <li>- limits at point</li> <li>- theorems in limits</li> <li>- continuous and theorems.</li> <li>- Properties of continuous functions.</li> </ul>
<b>Algebra</b>	<ul style="list-style-type: none"> <li>- Limits</li> <li>- The first derivative</li> <li>- Founding the first derivative using the limits (definition).</li> <li>- Rules of differential</li> <li>- applications of differential : speed, and acceleration, maximum and minimum values.</li> <li>- Integration</li> <li>- Definition of integral calculus (limited and unlimited),</li> </ul>	<ul style="list-style-type: none"> <li>- Finding derivative of functions by means of the definition.</li> <li>- Reviewing to the fundamental theorems of derivative</li> <li>- Theorems in continuity : conservative sign, Belzano theory, intermediate-value.</li> <li>- Concept of trigonometric derivatives, and founding the derivatives of functions</li> <li>- Derivatives of rational functions</li> <li>- Concept of chain rule and finding the derivative</li> <li>- Solving application problem on rate related to the time</li> <li>- Solving problems on higher derivatives using the chain rules.</li> </ul> Application on differentiation <ul style="list-style-type: none"> <li>- Concept and describing of local extreme</li> </ul>	<ul style="list-style-type: none"> <li>- sine law, and cosine law</li> <li>- solving the triangles in general</li> <li>- Solving applications in two and three dimension among its.</li> <li>- Differentiation: average rate derivative</li> <li>- rules of derivative</li> <li>- higher derivatives</li> <li>- chain rule derivative</li> <li>- periodic functions derivative</li> <li>- implicit derivatives</li> </ul> application on differentiation <ul style="list-style-type: none"> <li>- related rates applications</li> <li>- intermediate-value theorem.</li> <li>- First derivative (periods of increasing and decreasing functions) applications.</li> <li>- local extreme values of functions</li> </ul>

		<p>values, maximum and minimum values</p> <ul style="list-style-type: none"> <li>- Concepts and describing of decreasing and increasing functions,</li> <li>- Fundamental Theorems on differential applications</li> <li>- Finding the domains (intervals) of decreasing and increasing to a given functions</li> <li>- Finding the local extreme values, maximum and minimum values of a given functions.</li> <li>- Concept of the sign for the first derivative,</li> <li>- Concept of critical point, test of critical point,</li> <li>- Finding the critical points for a given functions, and test the derivative sign</li> <li>- Concept of concave to up and down for function</li> <li>- Concept of Inflection point , and finding for a given function</li> <li>- Using the second derivative to identified the interval of concaves (up and down)</li> <li>- Finding the inflection point to discuss the property of functions.</li> <li>- Using the properties of first and second derivative to draw the curves of functions.</li> <li>- Solving applications problem on the second derivative</li> <li>- Drawing the graph of some rational functions</li> </ul> <p>Integration</p> <ul style="list-style-type: none"> <li>- Concept of partition, advance partition, and systematic partition, and summation</li> <li>- Definition of integration as a limit of summation of systematic partition.</li> </ul>	<p>(maximums and minimums values).</p> <ul style="list-style-type: none"> <li>- Second derivative and applications (periods of concave up and down of functions).</li> <li>- Real life applications on local extreme values.</li> </ul> <p>Integration and application</p> <ul style="list-style-type: none"> <li>- limited integration and properties.</li> <li>- The fundamental theorem in Differentiation and Integration.</li> <li>- Unlimited integration</li> <li>- integration of logarithmic and exponential functions.</li> <li>- Methods of integration.</li> </ul>
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		<ul style="list-style-type: none"> <li>- Fundamental properties of integration (limited and unlimited).</li> <li>- The fundamental theorem :the relationship between differentiation and integration.</li> <li>- Concept of integration by substitution.</li> <li>- Using the integration by substitution to find the integration of a given functions.</li> <li>- Concept of integration by parts</li> <li>- Using the integration by parts to find the integration of a given functions</li> <li>- Concept of integration by partial fraction</li> <li>- Using the integration by partial fraction to find the integration of a given functions</li> <li>- concept and finding the derivatives of logarithmic and exponential functions.</li> <li>- Finding the integration of logarithmic and exponential functions.</li> <li>- Solving deferential equation using the integration.</li> <li>- Funding the integration of trigonometric functions.</li> <li>- Sketching the graphs of functions and identify the areas and volume which required.</li> </ul>	
<b>Geometry</b>	<ul style="list-style-type: none"> <li>- Circle: the equation of circle if center and radius known , the general form of circle equation,</li> <li>- the relationship between a line and a circle and founding the length of tangent</li> <li>- the relationships between two circles in cases tangency and intersection .</li> </ul> <p>Solid Geometry</p> <ul style="list-style-type: none"> <li>- Review of prism and cylinder.</li> <li>- The concepts of Pyramid and cone, and fundamental theorems on their.</li> <li>- The concept of sphere, and Fundamental</li> </ul>	<ul style="list-style-type: none"> <li>- Proof the theorems related to the rules of derivative.</li> </ul> <p>Conic sections</p> <ul style="list-style-type: none"> <li>- Concept of : geometrical location, and conic section.</li> <li>- Concept of parabola, and the standard equations.</li> <li>- Concept of hyperbola, and the standard equations.</li> <li>- Concept of ellipse, and the standard equations.</li> <li>- Using the Properties of parabola, ellipse,</li> </ul>	<p>conic sections</p> <ul style="list-style-type: none"> <li>- Concept of conic sections:</li> <li>- Parabola , standards parametric equations and properties.</li> <li>- Ellipse standards parametric equations and properties.</li> <li>- Hyperbola standards parametric equations and properties.</li> <li>- Solving problems by using the standard forms of conic sections.</li> <li>- Representing complex numbers using Polar coordinate.</li> </ul>

	<p>theorems on it.</p> <ul style="list-style-type: none"> <li>- Representing the complex numbers by polar coordinates.</li> </ul> <p>Trigonometry</p> <ul style="list-style-type: none"> <li>- The relationship between sides and angles of a triangle,</li> <li>- finding the general solution of a right triangle</li> <li>- applying the trigonometric expressions on finding the distance and height.</li> </ul>	<p>and hyperbola and finding the equation.</p> <ul style="list-style-type: none"> <li>- Drawing the conic section if the equation is given.</li> <li>- Finding the tangent and perpendicular equation at point lies in it.</li> <li>-</li> </ul>	
<b>Measurement</b>	<ul style="list-style-type: none"> <li>- Calculating areas and volumes of Pyramid, sphere and cone .</li> <li>- applications of integral calculation ( areas and volume).</li> <li>- Newton's laws of motion,</li> <li>- momentum,</li> <li>- work, power, energy,</li> <li>- friction and equilibrium</li> </ul>	<ul style="list-style-type: none"> <li>- Founding the roots of polynomial functions using Belzano theorem.</li> <li>- Applications on derivatives: problems on velocity and acceleration.</li> <li>- The concept of area and volume which lies between the curve of function and coordinates axes.</li> <li>- Using the integration concept to find the area that lies between the curve of function and coordinates axes.</li> <li>- Using the integration concept to find the volume which lies between the curve of function and coordinates axes.</li> </ul>	<ul style="list-style-type: none"> <li>- applications on integration to find the areas and volume of shapes.</li> <li>- Using properties of continuous functions to approximate the roots of functions.</li> </ul>
<b>Data Analysis and Probability</b>	<p>Statistics,</p> <ul style="list-style-type: none"> <li>- Statistics data, graphing of statistic data,</li> <li>- measurement of central tendency,</li> <li>- deviation measurements,</li> <li>- normal distribution.</li> <li>- Coefficient of correlation</li> </ul> <p>Probability</p> <ul style="list-style-type: none"> <li>- Concept of probability and, random variable, expectation,</li> <li>- Sample space and experimental</li> <li>- laws of probability,</li> <li>- independent events and</li> <li>- binomial distribution.</li> </ul>	<p>Statistics</p> <ul style="list-style-type: none"> <li>- Describing and concept of: Collecting and organizing data, representing data: pie chart, bar graph, histogram, and frequency polygon.</li> <li>- Concept of the measurements of central tendency (mean, median, mode).</li> <li>- Calculating the measurements of central tendency (mean, median, mode).</li> <li>- Concept and finding the measurements of deviation (variance , standard deviation and average deviation).</li> <li>- Calculating the measurements of deviation</li> </ul>	<ul style="list-style-type: none"> <li>- concept of probability and their laws.</li> <li>- condition probability and independent probability distribution</li> <li>- random variable and function of density probability</li> <li>- compute expectation and solving problems.</li> </ul>



		<p>(variance , standard deviation and average deviation).</p> <ul style="list-style-type: none"> <li>- Concept and calculating the correlation coefficient,</li> <li>- Effects of the arithmetic operation on the measurements of tendency, deviation and correlation coefficient.</li> <li>- The concept of normal distribution, the figure of distribution.</li> <li>- Solving problems by using the tables of normal distribution.</li> </ul> <p>Concept and finding the regression equation.</p> <p>Probability</p> <ul style="list-style-type: none"> <li>- Describing the Concept of : random experiment, sample space, simple event, disjoint events, probability function.</li> <li>- Proof the theorems related to the laws of probability.</li> <li>- Fundamental laws of probability.</li> <li>- Using the fundamental laws of probability to solve problems.</li> <li>- Concept of independent events , conditional probability</li> <li>- Solving problems on independent events , conditional probability</li> <li>- Using Bayer's Theory in solving problems.</li> <li>- Concept of :random variable, probability distribution,</li> <li>- Using binomial random variable to find the probability.</li> <li>- Finding the expectation of random variables</li> </ul>	
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