Blue Print for Math Grade 1

Content Strand	Sub-content Strand	SLO#	SLO	Weightage
NUMBERS AND OPERATIONS	**1- Comparison of objects and position**	1	Compare objects to identify: o long, longer, longest, o short, shorter, shortest, o tall, taller, tallest, o high, higher, highest, o heavy, heavier, heaviest o light, lighter, lightest.	3.30%
	2- Counting (1 to 9)	2	Read numbers up to 9 in numerals and words.	10%
		3	Write numbers up to 9 in numerals and in words.	
		4	Count Objects up to 9 and represent in numbers.	
	3- Sequence of Numbers	5	Count forward and backward from 1-9.	10%
		6	Identify which number (up to 9) Comes; o before/after a number o between two numbers	
		7	Arrange numbers in ascending and descending numbers.	
	4- Concept of Zero	8	Identify zero as a number.	3.30%
	5- Addition	9	Add two 1-digit numbers (sum up to 9).	3.30%
	6- Subtraction	10	Subtract two 1 digit numbers (up to 9).	6.70%
		11	Fill up the equation such as 9 - □ = 7 with proper number.	
	7- Concept of Tens	12	Identify 10 as number.	3.30%
	8- Counting (11-100)	13	Read numbers up to 99.	23.30%
		14	Write numbers up to 99	
		15	Count numbers up to 99.	
		16	Identify the Place Value of the specific digit in a two digit numbers.	
		17	Compare one and two digit numbers.	
		18	Write the numbers in increasing and decreasing numbers up to 99.	

		19	Identify and write missing numbers in a sequence from 1 to 100.	
	9- Addition & Subtraction	20	Add 2-digit numbers with 1-digit numbers.	13.40%
		21	Subtract ones from two digit numbers.	
		22	Addition of two 2-digit numbers.	
		23	Subtract 2-digit numbers from 2 digit numbers.	
GEOMETRY	**10- Geometry**	24	Recognize and match objects from daily life of similar shapes.	6.70%
		25	Identify following basic shapes; Rectangle, square, circle, oval, triangle.	
TIME	**11- Time and Days of week**	26	Recognize the hour and minutes hand of an analog clock.	10%
		27	Read and tell time in hour from the digital clock.	
		28	Name in order the days of week.	
FINANCIAL ARITHMETIC	**12- Amount**	29	- Identify Pakistani currency coins (rupees 1, 2 & 5). - Identify Pakistani currency notes (Rupees 10, 20, 50 & 100).	6.7%
		30	Match a group of coins/notes to equivalent groups of different denominations.	

Blue Prints of Mathematics Grade 2

Content Strand	Sub-content Strand	SLO#	SLO (ENGLISH)	Weightage%
Number and Number Operations	Numbers	1	• Recognize the place values of numbers (tens andones).	20.7
		2	• Recognize the place value of a 3-digit number.	
		3	• Count and write in 100s (e.g. 100, 200,300,	
		4	• Compare 2- or 3-digit numbers(hundreds, tens andones).	
		5	• Idetify numbers given in ascending ordescendingorder.	
		6	• Write ordinal numbers from first Twentieth.	
	Fractions	7	• Recognize fraction as equal parts of awhole.	6.9
		8	• Identify half, one third and quarter with the help of objects andfigures.	
	Addition	9	• Add 1-digit numbers and 2-digitnumbers withoutcarrying.	10.3
		10	• Add 3-digit numbers and 3-digit numbers with carrying of tens and hundreds.	
		11	• Solve real life problems with carrying oftens andhundreds.	
	Subtraction	12	• Subtract 1-digit numbers and 2-digitnumbers without borrowing.	13.8
		13	• Subtract 3-digit numbers from3-digit numbers without borrowing.	
		14	• Solve real life problems of subtraction withborrowing.	
		15	• Solve simple problems regardingaddition and subtraction with carrying/borrowing in mixedform.	
	Multiplication	16	• Recognize multiplication as repeated addition (e.g. 2 + 2 + 2=6 3 times 2 = 3× 2 = 6).	10.3
		17	• Recognize and use multiplication symbol‘×’.	

		18	• Develop multiplication tables of 2, 3, 4, 5and 10 and the multiplication 10×10.	
	Division	19	• Recognize division as successive subtraction.	6.9
		20	• Divide numbers within the multiplication tables with remainderzero.	
Measurement and Geometry	Geometry	21	• Identify the figures like square, rectangle, triangle, circle, semi-circle andquarter-circle.	6.9
		22	• Identify vertices and sides of a triangle, rectangle andsquare.	
	Measurements	23	• Recognize the standard units oflength, i.e. metre, centimetre. Read and write standard units of length including abbreviations.	17.2
		24	• Use appropriate units of length to measure (with straightedge/ ruler) the objects.	
		25	• Solve real life problemsinvolving measurements.	
		26	• Read and write standard units ofmass/ weight includingabbreviations.	
		27	• Read and write standard units ofcapacity / volume including abbreviations.	
	Time	28	• Know the number of hours in a dayand number of minutes in an hour.	6.9
		29	• Use solar calendar to find a particulardate.	
				100.0

Blue Prints of Mathematics Grade 3

Content Strand	Sub-content Strand	SLO#	SLO (ENGLISH)	Weightage%
Number and Operations	1- اعداد	1	Read and write given numbers up to 100,000(hundred thousands) un numerals and in words	11.9
		2	Compare two umbers using symbols <,> and =	
		3	Compare three umbers using symbols <,> and =	
		4	Write the given set of numbers in ascending and descending order.	
		5	Write even or odd numbers written in given sequence	
	2- جمع	6	Add numbers up to 3 digits (with and without carrying) vertically and horizontally..	7.1
		7	Add numbers up to 4 digits (with and without carrying) vertically and horizontally..	
		8	Solve real life problems involving addition	
	3- تفریق	9	Subtract Numbers upto two digits with and without borrowing.	9.5
		10	Subtract Numbers upto 3 digits with and without borrowing.	
		11	Subtract Numbers upto 3 digits with and without borrowing.	
		12	Solve real life problems involving subtraction	
		13	Use the term product of multiplication of two numbers	

	4۔ مسلسل جمع اور ضرب	14	Develop multiplication tables 6,7,8,9	11.9
		15	Multiply a number by zero	
		19	Multiply 2-digit number by 1-digit number	
		17	Solve real life problems involving multiplication of 2-digits numbers by 1-digit	
	5- مسلسل تفریق اور تقسیم	18	Concept of repeated subtraction & division	7.1
		19	Divide 2-digits number by 1-digit number	
		20	Solve real life problems involving division of 2-digits number by 1-digit number	
Measurement and Geometry	6- لمبائی، کمیت اور حجم کیا پیمائش	21	Measure and write standard units of length including abbreviations.	21.4
		22	Add measures of length in same units with and without carrying	
		23	Measure and write standard units of mass/ weights including abbreviations	
		24	Add measures of mass/weight in same units with and without carrying	
		25	Subtract measures of mass/weight	
		26	Standard of measures of volume	
		27	Addition of measures of volume	
		28	subtraction of measures of volume	
		29	Solve real life problem involving units	
Number and Operations	7- کسور	30	Express the fractions in figures and vice versa	11.9
		31	Compare fractions , with same denominators, using symbols <, >,	
		32	Add two fraction with same denominators	
		33	Subtract fraction with same denominators	
		34	Identify equivalent fractions from the given figures	
	8- وقت	35	Know the numbers of hours in a day and number of minutes in an hour	9.5
		36	Read and write the time from a clock in hours and minutes	
		37	Recognize am and pm	
		38	Draw hands of clock to show time in hours and minutes	
Geometry	9-اشکال	39	Classify figures according to number of sides as quadrilaterals (rectangle , square) and triangle	7.1
		40	Identify circle, its radius, and diameter	
		41	Calculate perimeter of squares, rectangle and triangle	
Information Handling	10- تصویری گراف	42	Read and interpret picture graph.	2.4
				100.0

Blue Print for Mathematics Grade 4

Content Strand	Sub-content Strand	SLO#	SLO (ENGLISH)	Weightage
Arithmetic	1- Numbers	1	Identify place values of digits up to one hundred million.	6%
		2	Recognize numbers in words up to one hundred million.	
		3	Number line.	
		4	Compare and order numbers up to 8 digits.	
	2- Addition and Subtractio	5	Add numbers up to 6 digits.	6%
		6	Solve real life problems involving Addition of numbers up to 6 digits.	
		7	Subtract numbers up to 6 digits.	
		8	Solve real life problems involving Subtraction of numbers up to 6 digits.	
	3- Multiplication and Division	9	Revision of basic concepts of multiplication.	11%
		10	Revision of tables (7-9)	
		11	Multiply numbers up to 5 digits by numbers up to 3 digits.	
		12	Solve real life problems involving multiplication.	
		13	Revision of basic concepts of division.	
		14	Divide numbers up to 4 digits by numbers up to 2 digits.	
		15	Solve real life problems involving division	
	4-Factors and Multiples	16	Identify divisibility rules for 2, 3, 5 and 10.	12%
		17	Define prime and composite numbers.	
		18	Differentiate between prime and composite numbers.	
		19	List the first 12 multiples of a 1-digit number.	
		20	List factors of a number up to 50.	
		21	Factorize a number by using prime factors.	
		22	Find LCM by using: • common multiples, • prime factorization.	
		23	Find HCF of two or more 2-digit numbers using common multiples prime factorization.	
	5- Fractions	24	Define a fraction.	12%
		25	Recognize like and unlike fractions.	
		26	Compare two like fractions	
		27	Arrange fractions in ascending and descending order.	
		28	Add and subtract fractions with same denominators.	
		29	Multiply fractions with whole numbers.	
		30	Divide a fraction by a whole number.	

		31	Add and subtract fractions with unlike denominators.	
	6- Decimal Fractions	32	Define decimal as a fraction whose denominator is 10 or a power of 10.	6%
		33	Recognize the places occupied by the digits, after the decimal point, as decimal places.	
		34	Identify the place value of a digit in decimals.	
		35	Add and subtract decimals (Upto 2 decimal places)	
Measurments	7- Measurements	36	Convert of units to length.	14%
		37	Conversion of units to mass/weight.	
		38	Conversion of units to capacity.	
		39	Add and subtract expressions involving units of mass/weight, Volume capacity and length.	
		40	Read time in hours, minutes and seconds.	
		41	Convert hours to minutes and minutes to seconds.	
		42	Convert years to months, months to days and weeks to days.	
		43	Add and subtract units of time without carrying /borrowing.	
		44	Solve simple real life problems involving conversion, addition and subtraction of units of time.	
Geometry	8- Geometry	45	Measure the length of a line in centimeters and millimeters using straightedge/ruler and dividers.	30%
		46	Draw a straight line of given length using a straightedge/ruler and dividers.	
		47	Draw a curved line and measure its length using thread/dividers and straightedge/ruler.	
		48	Recognize horizontal and vertical lines.	
		49	Draw a vertical line on a given horizontal line using set squares.	
		50	Recognize parallel and non-parallel lines.	
		51	Identify parallel and non-parallel lines from a given set of lines.	
		52	Draw a parallel line to a given straight line using set squares.	
		53	Draw a line which passes through a given point and is parallel to a given line (using set squares).	
		54	Recognize an angle through non-parallel lines.	
		55	Draw an angle AOB with vertex (O) and arms (OA, OB) to recognize the notation ∠AOB for an angle AOB.	
		56	Recognize right angle through horizontal and vertical lines.	

		57	Demonstrate acute and obtuse angles via the right angle.	
		58	Recognize the standard unit for measuring angles as one degree (1^o) which is defined as 360^o of a complete revolution.	
		59	Measure angles using protractor where ○ upper scale of protractor reads the measure of ○ lower scale of protractor reads the measure of angle from right to left.	
		60	Draw a right angle using protractor.	
		61	Draw acute and obtuse angles of different measures using protractor.	
		62	Draw an angle (using protractor) ○ equal in measure of a given angle, ○ twice the measure of a given angle, ○ equal in measure of the sum of two given angles.	
		63	Identify centre, radius, diameter and circumference of a circle.	
		64	Draw a circle of given radius using compasses and straightedge/ruler.	
Information Handling	**9- Information Handling**	65	Read and interpret simple bar graphs given in horizontal and vertical form.	30%
		66	Read and interpret line graph.	

Mathematics G-V- Blueprint

Level 1	Level 2	Level 4	
Area	**Sub-area**	**Generic Examples (useful for item-writing)**	**SLO no**
1 - ARITHMETIC	NUMBERS	Read numbers up to 1 000 000 000 (one billion) in numerals and in words.	1
	15%	Write numbers up to 1 000 000 000 (one billion) in numerals and in words.	2
81%		Add numbers of complexity and of arbitrary size	3
		Subtract numbers of complexity and of arbitrary size	4
		Multiply numbers, up to 6 digits, by 2 digits and 3 digits numbers	5
		Divide numbers, up to 6 digits, by 2 digits and 3 digits numbers	6
		Solve real life problems involving mixed operations of addition, subtraction, multiplication and division.	7
		Carryout combined operations using BODMAS rule.	8
		Verify distributive laws.(Multiplication and Division)	9
	HCF&LCM	Find HCF of three numbers, up to 2 digits, using prime factorization method,	10
	8%	Find HCF of three numbers, up to 2 digits, using Division method	11
		Find LCM of four numbers, up to 2 digits, using prime factorization method	12
		Find LCM of four numbers, up to 2 digits, using division method	13
		Solve real life problems involving HCF&LCM	14
	FRACTIONS	Add and subtract two and more fractions with different denominators.	15
	8%	Multiply a fraction by a number and demonstrate with the help of diagrams.	16
		Multiply two or more fractions involving brackets (proper, improper and mixed fractions).	17
		Divide a fraction by another fraction (proper, improper and mixed).	18
		Simplify expressions involving fractions using BODMAS rule.	19
	Decimals and Percentages	Add and subtract decimals	20
	24%	Multiply decimals by 10, 100 and 1000	21
		Divide decimals by 10, 100 and 1000.	22
		Multiply a decimal with a whole number	23

		Divide a decimal with a whole number	24
		Multiply a decimal by a decimal (with three decimal places).	25
		Divide a decimal by a decimal (by converting decimals to fractions).	26
		Simplify decimal expressions involving brackets (applying one or more basic operations).	27
		Round off decimals up to specified number of decimal place	28
		Convert fractions to decimals and vice versa	29
		Solve real life problems involving decimals	30
		Recognize percentage as a special kind of fraction	31
		Convert percentage to fraction and to decimal and vice versa.	32
		Solve real life problems involving percentages	33
	DISTANCE TIME&TEMP	Convert measures given in i)kilometres into meters ii)meters into centimetres iii)centimetres to millimetres and vice vesa.	34
	18%	Add and subtract measures of distances	35
		Convert hours to minutes, minutes to seconds and vice versa	36
		Convert years to months, months to days, weeks to days and vice versa.	37
		Solve real life problems involving conversion, addition and subtraction of units of time.	38
		Recognise units of temperature in Fahrenheit and Celsius.	39
		Solve real life problems involving conversion, addition and subtraction of units of temperature.	40
	Unitary Methods	Calculate the value of a number of same type of objects when the value of another of the same type is given (unitary method)	41
	8%	Define and identify direct and inverse proportion	42
		Solve real life problems involving direct and inverse proportion (by unitary method).roof	43
2- GEOMETRY 6%	ANGLES TRIANGLES QUADRILATERALS 6%	Recall an angle and recognize acute, right, obtuse, straight and reflex angle.	44
		Use protractor to construct: · A right angle · A straight angle · Reflex angles Of different measures.	45

		Recognize the kinds of quadrilateral (square, rectangle, rhombus, Parallelogram, trapezium and kite).	46
Paremeter & Area 5%	Paremeter & Area 5%	Differentiate between perimeter and area of a region	47
		Apply formulas to find perimeter and area of a square and rectangular region..	48
		Solve appropriate problems of perimeter and area	49
Information Handling **8%**	**Information Handling** **8%**	Find an average of given numbers	50
		Solve real life problems involving average.	51
		Draw block graphs or column graphs.	52
		Read a simple bar graph given in horizontal and vertical form.	53
		Interpret a simple bar graph given in horizontal and vertical form.	54
100%	**100%**	**Total Percentage**	

Blue Print for Math Grade 6

Content Strand	Sub-Content Strand	SLO #	SLO	Weightage
1- ARITHMETIC	**1- SET**	1	Define set. Recognize notation of a set and its objects/elements.	4.2%
		2	Describe tabular form of a set and demonstrate through examples.	
		3	Define • finite and infinite sets, • empty/void/null set, • equal and equivalent sets.	
		4	Define • subset and superset of a set, • proper and improper subsets of a set and demonstrate through examples.	
	2- Whole Numbers	5	Identify whole numbers and their notations	7.3%
		6	Represent • a given list of whole numbers, whole numbers < (or >) a given whole number, • whole number ≥ (or ≤) a given whole number • whole numbers > but < a given whole number, • whole number ≥ but ≤ a given whole number	
		7	Verify commutative and associative law (under addition) of whole numbers.	
		8	Multiply and divide two given whole numbers.	
		9	Verify commutative and associative law (under multiplication) of whole numbers.	
		10	Verify distributive law of multiplication over addition.	
		11	Verify distributive law of multiplication over subtraction (with positive difference)	
	3- Factors and Multiples	12	Define even numbers as the numbers, which are multiples of 2.	12.6%
		13	Define odd numbers as the numbers, which are not multiples of	

		14	Define prime numbers as numbers which have only two factors (i.e., 1 and itself).	
		15	Test by inspection whether the numbers 2, 3, 4, 5, 6, 8, 9, 10, 11, 12 and 15 can divide a given number.	
		16	Define prime factorization as the process of factorizing a number into its prime factors.	
		17	Recognize index notation.	
		18	Factorize a given number and express its factors in the index notation.	
		19	Define HCF as the greatest number, which is a common factor of two or more numbers.	
		20	Find HCF of two or more than two numbers by: ○ prime factorization, ○ long division method.	
		21	Define LCM as the smallest number, which is a common multiple of two or more numbers.	
		22	Find LCM of two or more numbers by prime factorization	
		23	Solve real life problems related to HCF and LCM	
	4- Integers	24	Represent integers on number line.	12.6%
		25	Know that on the number line any number lying ○ to the right of zero is positive, ○ to the left of zero is negative, ○ to the right of another number is greater, ○ to the left of another number is smaller.	
		26	Know that every positive integer is greater than a negative integer.	
		27	Know that every negative integer is less than a positive integer.	
		28	Use number line to display sum of two or more given negative integers, sum of two given integers.	
		29	Add two integers (with like signs) in the following three steps: • Take absolute values of given integers, • Add the absolute values, • Give the result the common sign.	

		30	Add two integers (with unlike signs) in the following three steps: • Take absolute values of given integers, • Subtract the smaller absolute value from the larger, • Give the result the sign of the integer with the larger absolute value.	
		31	Recognize subtraction as the inverse process of addition.	
		32	Subtract one integer from the other by changing the sign of the integer being subtracted and adding according to the rules for addition of integers.	
		33	Recognize that • the product of two integers of like signs is a positive integer, • the product of two integers of unlike signs is a negative integer.	
		34	Recognize that division is the inverse process of multiplication.	
		35	Recognize that on dividing one integer by another • if both the integers have like signs the quotient is positive, • if both the integers have unlike signs the quotient is negative.	
		36	Know that division of an integer by '0' is not possible.	
	5- Simplifications	37	Know that the following four kinds of brackets ○ vinculum, ○ ( ) parentheses or curved brackets or round brackets, ○ { } braces or curly brackets, [ ] square brackets or box brackets, ○ are used to group two or more numbers together with operations.	5.2%
		38	Know the order of preference as, ( ), { } and [ ], to remove (simplify) them from an expression.	
		39	Recognize BODMAS rule to follow the order in which the operations, to simplify mathematical expressions, are performed.	

	40	Simplify mathematical expressions involving fractions and decimals grouped with brackets using BODMAS rule.	
	41	Solve real life problems involving fractions and decimals.	
6- Ratio and proportion	42	Define ratio as a relation which one quantity bears to another quantity of the same kind with regard to their magnitudes.	9.5%
	43	Know that of the two quantities forming a ratio, the first one is called antecedent and the second one consequent.	
	44	Know that a ratio has no units.	
	45	Calculate ratio of two numbers.	
	46	Reduce given ratio into lowest (equivalent) form.	
	47	Describe the relationship between ratio and fraction.	
	48	Know that an equality of two ratios constitutes a proportion, e.g., a:b::c:d,where a, d are known as extremes and b, c are called the means.	
	49	Find proportion (Direct & Inverse)	
	50	Solve real life problems involving direct and inverse proportion	
7- Financial Arithmetic	51	Recognize percentage as a fraction with denominator of 100.	8.5%
	52	Convert a percentage to a fraction by expressing it as a fraction with denominator 100 and then simplify.	
	53	Convert a fraction to a percentage by multiplying it with 100%.	
	54	Convert a percentage to a decimal by expressing it as a fraction with denominator 100 and then as a decimal.	
	55	Convert a decimal to a percentage by expressing it as a fraction with denominator 100 then as a percentage.	
	56	Define • profit, profit percentage	
	57	Define: • Selling price and cost price, Profit, loss and discount, • Profit percentage and loss percentage	
	58	Solve real life problems involving profit, loss and discount.	

8- Introduction to algebra	59	Explain the term algebra as an extension of arithmetic in which letters replace the numbers.	11.6%
	60	Know that ○ a sentence is a set of words making a complete grammatical structure and conveying full meaning. sentences that are either true or false are known as statements. ○ a statement must be either true or false but not both. ○ a sentence that does not include enough information required to decide whether it is true or false is known as open statement (e.g. Δ+2 = 9). ○ a number that makes an open statement true is said to satisfy the statement (e.g. Δ = 7 makes the statement Δ+2 = 9 true) ○ use English alphabet x in the open use English alphabet x in the open statement Δ+2 = 9 to modify it to x+2=9	
	61	Define variables as letters used to denote numbers in algebra.	
	62	Know that any numeral, variable or combination of numerals and variables connected by one or more of the symbols "+" and "–" is known as an algebraic expression (e.g. x+2y)	
	63	Know that x, 2y and 5 are called the terms of the expression x+2y+5.	
	64	Know that the symbol or number appearing as multiple of a variable used in algebraic term is called its coefficient (e.g. in 2y, 2 is the coefficient of y).	
	65	Know that the number, appearing in algebraic expression, independent of a variable is called a constant term (e.g. in x+2y+5, number 5 is a constant term).	
	66	Differentiate between like and unlike terms.	
	67	Know that like terms can be combined to give a single term, addition or subtraction cannotbe performed with unlike terms.	
	68	Add and subtract given algebraic expressions.	
	69	Simplify algebraic expressions grouped with brackets.	

	9- Introduction to Algebra	70	Evaluate and simplify an algebraic expression when the values of variables involved are given.	6%
		71	Define an algebraic equation.	
		72	Differentiate between equation and an expression.	
		73	Define linear equation in one variable.	
		74	Solve simple linear equations involving two variables and if one variable is given	
		75	Solve real life problems involving linear equations.	
Geometry	**10- Geomeetry**	76	Add measures of two or more-line segments.	10.5%
		77	Subtract measure of a line segment from a longer one.	
		78	Draw a right bisector of a given line segment using compasses.	
		79	Draw a perpendicular to a given line from a point on it using compasses.	
		80	Draw a perpendicular to a given line, from a point outside the line, using compasses.	
		81	Use compasses to • construct an angle equal in measure of a given angle, • construct an angle twice in measure of a given angle, • bisect a given angle,	
		82	Construct a triangle when three sides (SSS) are given.	
		83	Construct a triangle when two sides and their included angle (SAS) are given.	
		84	Construct a triangle when two angles and the included side (ASA) are given.	
		85	Construction of a right-angled triangle.	
Perimeter and Area	**11- Perimeter and Area**	86	Find perimeter and area of a square and a rectangle.	6.3%
		88	Solve real life problems related to perimeter and area of a square and rectangle.	
		87	Find area of path (inside or outside) of a rectangle or square.	
		89	Find area of a parallelogram when altitude and base are given.	
		90	Define trapezium and find its area when altitude and measures of the parallel sides are given.	

		91	Find area of a triangle when measures of the altitude and base are given.	
	12- Three dimentional Solids	92	Find surface area and volume of cube Find surface area and volume of cuboid.	1%
Information Handling	**13- Information Handling**	93	Distinguish between grouped and ungrouped data.	3.15%
		94	Draw horizontal and vertical bar graphs.	
		95	Read a pie graph.	

Blue Print for Mathematics Grade 7

Content Strand	Sub-Content Srand		SLO Number	SLO	Weightage%
	SETS	Operations on set	1	Define union, intersectionand difference of two sets.	6.944444444
			2	Find union of two or more sets, intersection of two or more sets, and difference of two sets.	
			3	Define and identify disjoint and overlapping sets.	
			4	Define a universal set and complement of a set.	
			5	Verify different properties involving union of sets, intersection of sets, difference of sets and complement of a set.	
	RATIONAL NUMBERS	Operations on Rational Numbers	6	Add two or more rational numbers.	16.66666667
			7	Subtract a rational number from another.	
			8	Find additive inverse of a rational number.	
			9	Find multiplicative inverse of a rational number.	
			10	Multiply two or more rational numbers.	
			11	Divide a rational number by a non-zero rational number.	
			12	Find reciprocal of a rational number.	
		Properties of Rational Numbers	13	Compare two rational numbers.	
			14	Arrange rational numbers in descending order or in ascending order.	
			15	Verify commutative property of rational numbers with respect to addition and multiplication.	
			16	Verify associative property of rational numbers with respect to addition and multiplication.	
			17	Verify distributive property of rational numbers with respect to multiplication over addition/ subtraction.	

ARITHMETIC	DECIMAL NUMBERS	Conversion of decimals to rational numbers	18	Convert decimals to rational numbers.	2.777777778
		Terminating and non-terminating decimals	19	Get an approximate value of a number, called rounding off, to a desired number of decimal places.	
	EXPONENTS	Exponents / Indices	20	IdentIfy base, exponent and value.	5.555555556
		Laws of Exponents	21	Use ratonal numbers to deduce laws of exponents. Product Law: when bases are same but exponents are different: $a^m \times a^n = a^{m+n}$ when bases are different but exponents are same: $a^n \times b^n = (ab)^n$	
			22	Quotient Law: when bases are same but exponents are different: $a^m \div a^n = a^{m-n}$ when bases are different but exponents are same: $a^n \div b^n = (\frac{a}{b})^n$	
			23	Power Law: $(a^m)^n = a^{mn}$ For zero exponent: $a^0 = 1$. For exponent as negative integer: $a^{-m} = \frac{1}{a^m}$	
		Perfect Squares	24	Define a perfect square.	
			25	Test whether a number is a perfect square or not	
			26	Identify and apply the following properties of perfect square of a number. • The square of an even number is even. • The square of an odd number is odd.	

	SQUARE ROOT OF A POSITIVE NUMBER		26	• The square of a proper fraction is less than itself. • The square of a decimal less than 1 is smaller than the decimal.	8.333333333
		Square Roots	27	Define square root of a natural number and recognize its notation.	
			28	Find square root, by factorization method, of natural number, which are perfect squares.	
			29	Find square root, by factorization method, • fraction, • decimal, which are perfect squares.	
	DIRECT AND INVERSE VARIATION	Continued Ration	30	Solve real life problems (involving direct and inverse proportion) using unitary method and proportion method.	6.944444444
		Proportion	31	Solve real life problems related to time and work using proportion.	
		Time, Work and Distance (relationship)	32	Find relation (i.e. speed) between time and distance.	
			33	Convert units of speed (kilometer per hour into meter per second and vice versa).	
			34	Solve variation related problems involving time and distance.	
	FINANCIAL ARITHMETIC	Taxes	35	Solve tax-related problems.	5.555555556
		Profit and Markup	36	Find the rate of profit/ markup per annum.	
			37	Solve real life problems involving profit/ markup.	
		Zakat & Ushr	38	Solve problems related to zakat.	
		Algebraic Expressions	39	Define a constant as a symbol having a fixed numerical value.	
			40	Recall variable as a quantity, which can take various numerical values.	
			41	Recall literal as an unknown number represented by an alphabet.	

ALGEBRA	ALGEBRAIC EXPRESSIONS	Algebraic Expressions	42	Recall algebraic expression as a combination of constants and variables connected by the signs of fundamental operations.	15.27777778
			43	Identify a monomial, a binomial and a trinomial as a polynomial having one term, two terms and three terms respectively.	
		Operations with Polynomials	44	Add two or more polynomials.	
			45	Subtract a polynomial from another polynomial.	
			46	Find the product of • monomial with monomial, • monomial with binomial/trinomial, • binomials with binomial/trinomial.	
			47	Simplify algebraic expressions involving addition, subtraction and multiplication	
		Algebraic Identities	48	Recognize and verify the algebraic identities: • $(x+a)(x+b)=x_2+(a+b)x+ab$,	
			49	Recognize and verify the algebraic identities: • $(a+b)^2=(a+b)(a+b)=a^2+2ab+b^2$, • $(a-b)^2=(a-b)(a-b)=a^2-2ab+b^2$, • a2−b 2=(a−b)(a+b).	
	LINEAR EQUATIONS	Solutions of Linear Equations	50	Solve linear equations of the type: • ax+b=c • (ax+b)/(cx+d)=m/n	2.777777778
			51	Solve real life problems involving linear equations.	
	FUNDAMENTALS OF GEOMETRY	Properties of Angles	52	Calculate unknown angles involving adjacent angles, complementary angles, supplementary angles and vertically opposite angles.	5.555555556
			53	Define, complementary and supplementary angles.	
		Congruent and Similar figures	54	Identify congruent figures.	
		Circle	55	Describe a circle and its centre, radius, diameter	

GEOMETRY	PRACTICAL GEOMETRY	Line Sagment	56	Divide a line segment into a given number of equal segments.	8.333333333
		Tirangles	57	Divide a line segment internally in a given ratio.	
			58	Construct an equilateral triangle when base is given,altitude is given.	
			59	Construct an isosceles triangle when base and a base angle are given,	
		Parallelogram	60	Construct a parallelogram when two adjacent sides and their included angle are given,	
			61	Construct a parallelogram when two adjacent sides and a diagonal are given.	
CIRCUMFERENCE AND AREA	CIRCUMFERENCE , AREA AND VOLUME	Circumference and Area of Circle	62	Express π as the ratio between the circumference and the diameter of the circel	12.5
				Find the diameter and radius of a circle using formula.	
			63	Find the circumference of a circle using formula.	
			64	Find the area of a circular region using formula	
		Surface Area and Volume of Cylinder	65	Find the surface area of a cylinder using formula.	
			66	Find the volume of a cylindrical region using formula.	
			67	Solve real life problems involving circumference and area of a circle,	
			68	Solve real life problems involving circumference and area of a circle,	
			69	Solve real life problems involving surface area and volume of a cylinder.	
			70	Solve real life problems involving surface area and volume of a cylinder.	
INFORMATION HANDLING	INFORMATION HANDLING	Frequency Distribution	71	Define frequency distribution (i.e. frequency, lower class limit, upper class limit, class interval).	2.777777778
		Pie Chart	72	Interpret and draw pie graph.	

Blue Print for Math Grade 8				
Content Strand	**Sub-content Strand**	**SLOs No.**	**Students' Learning Outcomes**	Weightage
ARITHMETIC	Sets	1	Find a subset of a set.	
	Sets	2	Define proper (⊂) and improper (⊆) subsets of a set.	
	Sets	3	Find power set P(*A*) of a set *A* .	
	Operations on Sets	4	Verify commutative and associative laws with respect to union and intersection.	
	Operations on Sets	5	Verify the distributive laws.	8%
	Irrational Numbers	6	Define an irrational number.	
	Irrational Numbers	7	Recognize rational and irrational numbers.	
	Irrational Numbers	8	Define real numbers	
	Irrational Numbers	9	Demonstrate non-terminating /non-repeating (or non-periodic) decimals.	
	Squares	10	Find perfect square of a number.	
	Squares	11	Establish patterns for the squares of natural numbers (e.g., 42 =1+2+ 3+ 4+ 3+ 2)	
	Square roots	12	Find square root of · a natural number (e.g. 16, 625, 1600), · a common fraction (), · a decimal (e.g. 0.01, 1.21, 0.64), given in perfect square form, by prime factorization and division method	
	Cubes and Cube Roots	13	Recognize cubes and perfect cubes.	
	Cubes and Cube Roots	14	Find cube roots of a number which are perfect cubes.	15%
	Number Systems	15	Recognize base of a number system.	
	Number Systems	16	Define number system with base 2, 5, 8 and 10	
	Number Systems	17	Explain • binary number system (system with base 2), • number system with base 5, • octal number system (system with base 8), • decimal number system (system with base 10).	
	Conversions	18	Convert a number from decimal system to a system with base 2, 5 and 8, and vice versa.	
	Conversions	19	Add, subtract and multiply numbers with base 2, 5 and 8	
	Conversions	20	Add, subtract and multiply numbers with different bases.	10%
	Compound Proportion	21	Define compound proportion.So lve real life problems involving compound proportion	
	Compound Proportion	22	Solve real life problems involving compound proportion, partnership and inheritance.	

	Banking	23	Convert Pakistani currency to well-known international currencies.	
	Banking	24	Calculate • the profit/ markup, • the principal amount, • the profit/ markup rate, • the period.	
	Percentage	25	Find percentage profit and percentage loss.	
	Percentage	26	Find percentage discount.	
	Insurance	27	Define insurance.	
	Insurance	28	Solve real life problems regarding life and vehicle insurance.	
	Income Tax	29	Explain income tax, exempt income and taxable income.	
	Income Tax	30	Solve simple real life problems related to individual income tax assessee.	18%
	Algebraic Expression	31	Recall constant, variable, literal and algebraic expression.	
	Polynomia	32	Define • polynomial, • degree of a polynomial, • coefficients of a polynomial.	
	Operations on Polynomials	33	Add, subtract and multiply polynomials.	
	Operations on Polynomials	34	Divide a polynomial by a linear polynomial.	6%
	Basic Algebraic Formulas	35	Recall the formulas: • $(a + b)^2 = a^2 + 2ab + b^2$, • $(a - b)^2 = a^2 - 2ab + b^2$, • $a^2 - b^2 = (a - b)(a + b)$, and apply them to solve problems like: · Evaluate $(102)^2$, $(1.02)^2$, $(98)^2$ and $(0.98)^2$. · Find $x^2 + \frac{1}{x^2}$ and $x^4 + \frac{1}{x^4}$	

Algebra			when the value of $x^2+\frac{1}{x^2}$ $x^4+\frac{1}{x^4}$,
			$\frac{1}{x}$ x ± 1 is given
	Factorization	36	Factorize expressions of the following types:
			• ka + kb + kc ,
			• ac + ad + bc + bd ,
			• $a^2 \pm 2ab + b^2$,
			• $a^2 - b^2$,
			• $a^2 \pm 2ab + b^2 - c2$.
	Manipulation of Algebraic Expression	37	Recognize the formulas:
			· $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$,
			· $(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$,
			and apply them to solve the problems like:
			· Find $x^3+\frac{1}{x^3}$
			and $x^3-\frac{1}{x^3}$
			when the value of $x^3+\frac{1}{x^3}$ $x^3-\frac{1}{x^3}$
			x ± 1 $\frac{1}{x}$
			is given.
	Simultaneous Linear Equations	38	Recognize simultaneous linear equations in one and two variables.
	Simultaneous Linear Equations	39	Give the concept of formation of linear equation in two variables.
	Simultaneous Linear Equations	40	Know that a single linear equation in two unknowns is satisfied by as many pair of values as required.
			two linear equations in two unknowns have only one solution (i.e., one pair of values).
	Solution of Simultaneous Linear Equations	41	Solve simultaneous linear equations using
			· method of equating the coefficients,
			· method of elimination by substitution,
			· method of cross multiplication.

	Solution of Simultaneous Linear Equations	42	Solve real life problems involving two simultaneous linear equations in two variables.	
	Elimination	43	Eliminate a variable from two equations by: · Substitution, · application of formulae.	18%
GEOMETRY	Parallel Lines	44	Describe the following relations between the pairs of angles when a transversal intersects two parallel lines. · Pairs of corresponding angles are equal. · Pairs of alternate interior angles are equal. and demonstrate them through figures.	
	Polygons	45	Demonstrate the following properties of a parallelogram. · Opposite sides of a parallelogram are equal. . Diagonals of a parallelogram bisect each othe r. · Opposite angles of a parallelogram are equal.	4%
	Construction of Quadrilaterals	46	Construct a square when the difference between its diagonal and side is given.	
	Construction of Quadrilaterals	47	Construct a kite when two unequal sides and a diagonal are given.	
	Construction of Quadrilaterals	48	Construct a regular hexagon when a side is given.	
	Construction of a Right Angled Triangle	49	Construct a right angled triangle · when hypotenuse and one side are given. · when hypotenuse and the vertical height from its vertex to the hypotenuse are given.	6%
	Pythagoras Theorem	50	Solve right angled triangles using Pythagoras theorem.	
	Hero's Formula	51	State and apply Hero's formula to find the areas of triangular and quadrilateral regions.	
	Surface Area and Volume	52	Find the surface area and volume of a sphere.	
	Surface Area and Volume	53	Find the surface area and volume of a cone.	6%
	Demonstrative geometry,	54	Define demonstrative geometry.	

	Demonstrative geometry, Reasoning, Axioms, Postulates and Theorem	55	Prove the following theorems along with corollaries and apply them to solve appropriate problems. If a straight line stands on another straight line, the sum of measures of two angles so formed is equal to two right angles.	2%
INTRODUCTION TO TRIGONOMETRY	Trigonometry, Trigonometric Ratios of Acute Angles	56	Define trigonometric ratios of an acute angle.	
	Trigonometry, Trigonometric Ratios of Acute Angles	57	Find trigonometric ratios of acute angles (30^{o} , 60^{o} and 45^{o}).	2%
INFORMATION HANDLING	Frequency Distribution	58	Construct frequency table.	
	Measures of Central Tendency	59	Calculate mean (average), weighted mean, median and mode for ungrouped data.	
	Measures of Central Tendency	60	Solve real life problems involving mean (average), weighted mean, median and mode.	5%